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VOLUME IVA

SELF-TENSIONING ACOUSTICAL
HORIZONTAL LINE ARRAY
(SPRAY)
DATA ANALYSIS, ~~III~~

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1978

Volume IVA, Data Points 7, 8 and 9
Raw Data *(11)*

9 JANUARY 1979

Distribution limited to U.S. Gov't. agencies
Proprietary Info.; *1 Feb 79*. Other
for this document must be referred to

NAVAL AIR DEVELOPMENT CENTER

WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

N62269-77-C-0139

N62269-78-M-6884

NATIONAL SECURITY INFORMATION
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SANDERS ASSOCIATES, INC.
OCEAN SYSTEMS DIVISION
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Classification Reviewed & Approved
By

R. L. Townsend 10 Jan 1979
R. L. Townsend Date

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Exempt from GDS of EO 11652
Exemption Category 3
Declassify on 31 Dec 1989

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VOLUME

IA	Summary - Test Results
IB	Detailed Description, Test Results
II	Data Analysis Facility and Data Reduction Methodology
IIIA	Data Points 1, 2 and 3 Raw Data
IIIB	Data Points 4, 5 and 6 Raw Data
IWA	Data Points 7, 8 and 9 Raw Data
IWB	Data Points 10, 11 and 12 Raw Data

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- 3.0 Data Point 7 2-8-77 0202Z (16 Element Beamformed Data)
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 Signal Level and SNR Calculations
 Signal Gain Array Gain Calculations
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 Beamformed ALIU Plots

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- 8.0 Data Point 8 3-15-77 1501Z (32 Element Beamformed Data)
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 - Beamformed ALIU Plots
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 - Signal Gain and Array Gain Calculations
 - Beamformer ALIU Plots

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NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly
from plot comparisons.

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SUMMARY OF DATA (CONTINUED)

• OMNI NOISE LEVELS

19 JANUARY 1977	DATA POINT 1
290 Hz	+64.6 dBre μ Pa/1 Hz
295 Hz	+64.2 dBre μ Pa/1 Hz

19 JANUARY 1977	DATA POINT 2
290 Hz	+64.7 dBre μ Pa/1 Hz
295 Hz	+65.4 dBre μ Pa/1 Hz

7 FEBRUARY 1977	DATA POINT 3
140 Hz	+74.5 dBre μ Pa/1 Hz
290 Hz	+67.5 dBre μ Pa/1 Hz

7 FEBRUARY 1977	DATA POINT 4
140 Hz	+73.3 dBre μ Pa/1 Hz
290 Hz	+65.6 dBre μ Pa/1 Hz

7 FEBRUARY 1977	DATA POINT 5
140 Hz	+76.6 dBre μ Pa/1 Hz
290 Hz	+68.4 dBre μ Pa/1 Hz

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7 FEBRUARY 1977 DATA POINT 6

140 Hz +76.0 dBreμPa/1 Hz
200 Hz +68.9 dBreμPa/1 Hz

8 FEBRUARY 1977 DATA POINT 7

140 Hz +70.1 dBreμPa/1 Hz
290 Hz +62.2 dBreμPa/1 Hz

15 MARCH 1977 DATA POINT 8

140 Hz +67.3 dBreμPa/1 Hz
290 Hz +61.6 dBreμPa/1 Hz

15 MARCH 1977 DATA POINT 9

140 Hz +68.2 dBreμPa/1 Hz
290 Hz +65.2 dBreμPa/1 Hz

16 MARCH 1977 DATA POINT 10

140 Hz +74.2 dBreμPa/1 Hz
290 Hz +64.6 dBreμPa/1 Hz

16 MARCH 1977 DATA POINT 11

140 Hz +70.2 dBreμPa/1 Hz
290 Hz +62.2 dBreμPa/1 Hz

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• OMNI NOISE LEVELS

16 MARCH 1977

140 Hz
290 Hz

DATA POINT 12

+72.0 dBrePa/1 Hz
+65.5 dBrePa/1 Hz

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INDEX

OPERATIONAL
DATA

ION

OPERATIONAL DATA	Avg. Signal Level dB	Avg. Noise Level dB	Bandwidth (MHz)	Bandwidth (MHz)	Area (km ²)	Area (km ²)	SNR	Linear Prob. Inc. Time	Corrected SNR
1 DATE: 1-15-77 TIME: 1812 RANGE: 91NM 290MHZ DEPTH: 1650FM 286MHZ	-497 -533	-567 -571	-1.8 -1.8	+15 +15	+8 +8	+100 +100	7.0 7.8	-4.8 -5.8	+2.2 -3.0
2 DATE: 1-19-77 TIME: 1608 RANGE: 91NM 290MHZ DEPTH: 1650FM 295MHZ	-515 -512	-566 -559	-1.0 -1.8	+15 +15	+8 +8	+100 +100	5.0 4.7	-5.2 -5.4	-1.2 -1.7
3 DATE: 2-27-77 TIME: 0310 RANGE: 175NM 140MHZ DEPTH: 1905FM 260MHZ	-325 -306	-457 -487	-1.8 -1.8	+10 +10	+12 +8	+100 +100	15.2 10.1	-4.2 -4.3	9.0 5.6
4 DATE: 2-27-77 TIME: 0118 RANGE: 159NM 140MHZ DEPTH: 1905FM 265MHZ	-344 -396	-469 -506	-1.8 -1.8	+10 +10	+12 +8	+100 +100	12.5 11.0	-4.2 -4.2	8.3 6.9
5 DATE: 2-27-77 TIME: 1542 RANGE: 110NM 140MHZ DEPTH: 1905FM 260MHZ	-300 -371	-435 -478	-1.8 -1.8	+10 +10	+12 +8	+100 +100	13.5 14.7	-4.2 -4.2	9.3 10.5
6 DATE: 2-27-77 TIME: 2032 RANGE: 70NM 140MHZ DEPTH: 1905FM 260MHZ	-247 -270	-492 -473	-1.8 -1.8	+10 +10	+12 +8	+100 +100	19.5 24.3	-4.6 -4.0	15.5 20.3

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O M N I

P A T I E N T	OPERATIONAL DATA	AVG SIGNAL LEVEL dBV	AVG ROUTE LEVEL dBV	BAUD WIDTH CONVE- TION	BAUD- WIDTH CONVE- TION	AREA- SENSI- TIVITY	AREA APX CONVE- SION	SNR	INTERNAL PROCESS- ING CONVE- SION	INTERNAL CONVE- SION SNR										
7	DATE: 2-15-77 TIME: 0102Z RANGE: 28 NM, 140 MZ DEPTH: 1800 FM, 280 MZ	-12.0 -17.5	-50.1 -59.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	34.1 36.5	-4.0 -4.0	30.1 32.5										
8	DATE: 3-15-77 TIME: 1501Z RANGE: 28 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-19.4 -15.2	-32.9 -54.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	33.5 39.4	-4.0 -4.0	29.5 35.4										
9	DATE: 3-15-77 TIME: 2131Z RANGE: 28 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-19.4 -12.5	-32.0 -51.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	36.6 38.5	-4.0 -4.0	32.6 34.5										
10	DATE: 3-16-77 TIME: 0633Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-23.3 -38.0	-44.0 -51.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	22.7 13.6	-4.0 -4.2	18.7 9.4										
11	DATE: 3-16-77 TIME: 0935Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-29.9 -41.5	-50.0 -54.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	20.2 12.5	-4.0 -4.2	16.2 8.3										
12	DATE: 3-16-77 TIME: 1148Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-24.8 -36.6	-48.2 -50.7	-1.8 -1.8	+10 +10	+12 +8	+100 +100	23.4 12.1	-4.0 -4.2	19.4 7.9										

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16 ELEMENT ARRAY

OPERATIONAL DATA	ELEMENT										ARRAY									
	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
1	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
2	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
3	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
4	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
5	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800
6	DATE	TIME	1000	2000	3000	4000	5000	6000	7000	8000	9000	1000	1100	1200	1300	1400	1500	1600	1700	1800

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NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 7 DATE 2-8-77 TIME 0202Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL dBV $\frac{1}{10}$ ABW

-50.1

SYSTEM SENSITIVITY dB/ μ B

-(-12) = -38.1

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -29.9

CONVERSION TO dBre μ Pa/1HZ

+100 = +70.1

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NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 7 DATE 2-8-77 TIME 0202Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL dBV $\frac{1}{10}$ ABW

-54.0

SYSTEM SENSITIVITY dB/ μ B

-(-8) = -46.0

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -37.8

CONVERSION TO dBrePa/1HZ

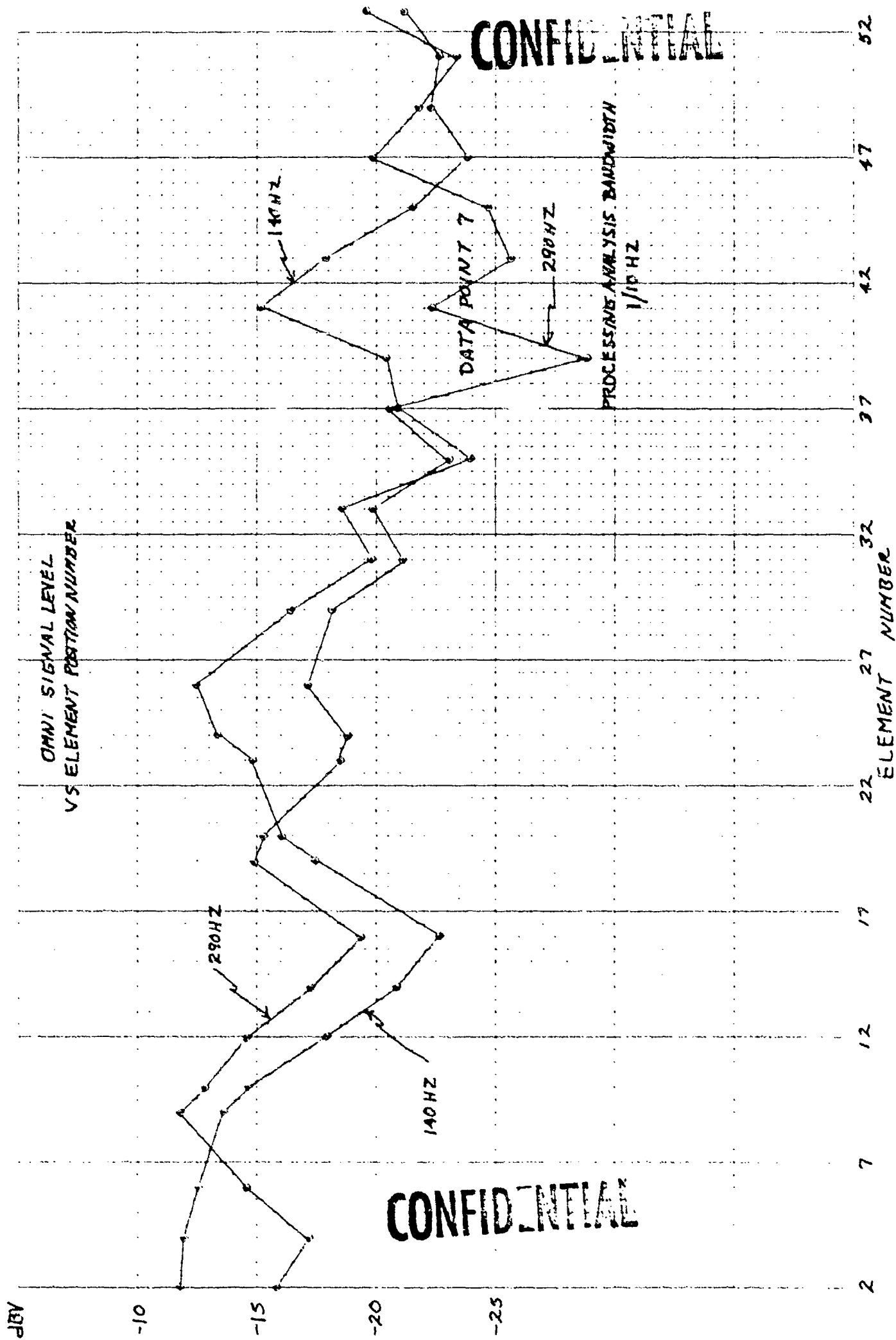
+100 = +62.2

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FIG. 2. 100 Hz BANDWIDTH



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1042 2000 2000 2000 2000

CONTROL: 28-0202 (27)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1710 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
ATTN: — DB
FILTER WTC: HANNING

140 HZ

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REEL: F29 INDEX 1145

DATE OF ANALYSIS:

CONTROL: 2-8-0202 (28)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WIG: HANNING

140 HZ

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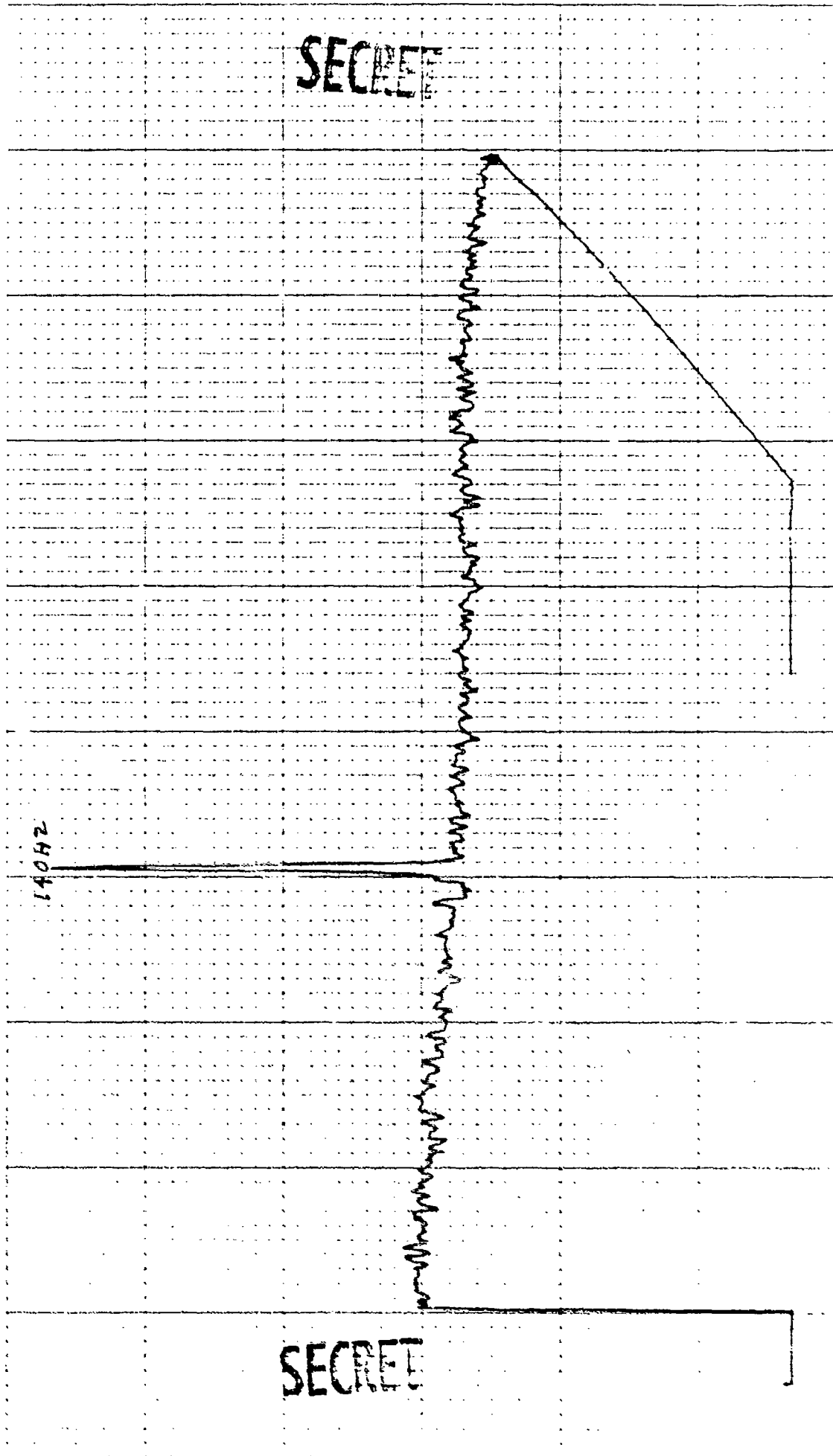
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CONTROL: 2-B - 0202 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10° Z
— DEG AZ STEERING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS
FILTER DB
ATTEN: - DB
WTG: HANNING



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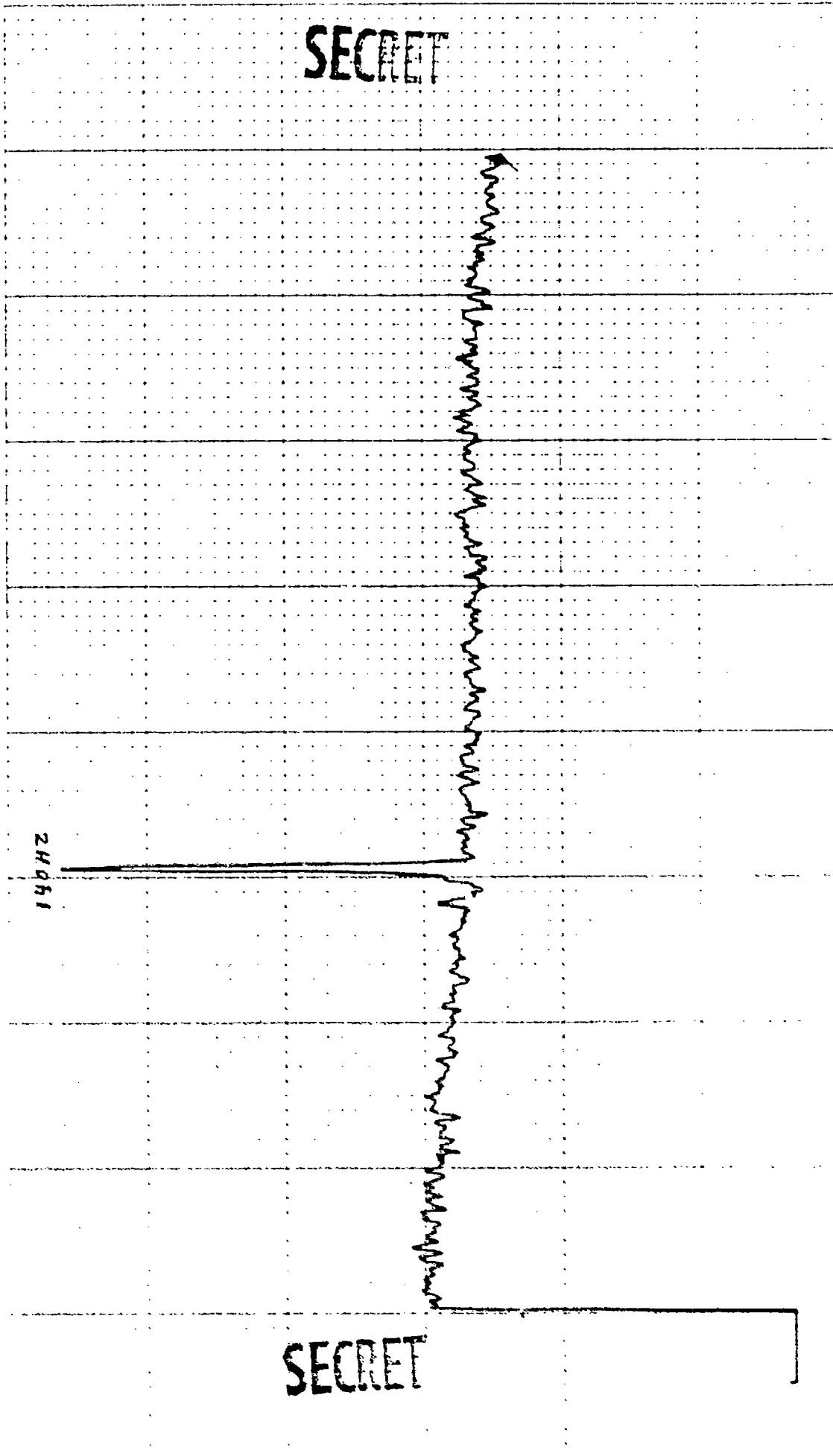
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CONTROL: 2-8 -0202 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
--- DEG AZ STEERING

REEL: F29
INDEX: 1145

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING



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REEL: F29 INDEX 1145

DATE OF ANALYSIS:

CONTROL: 2-8-0202(32)
OMNI SPECTRUM(ELEMENT 12)

EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

140HZ

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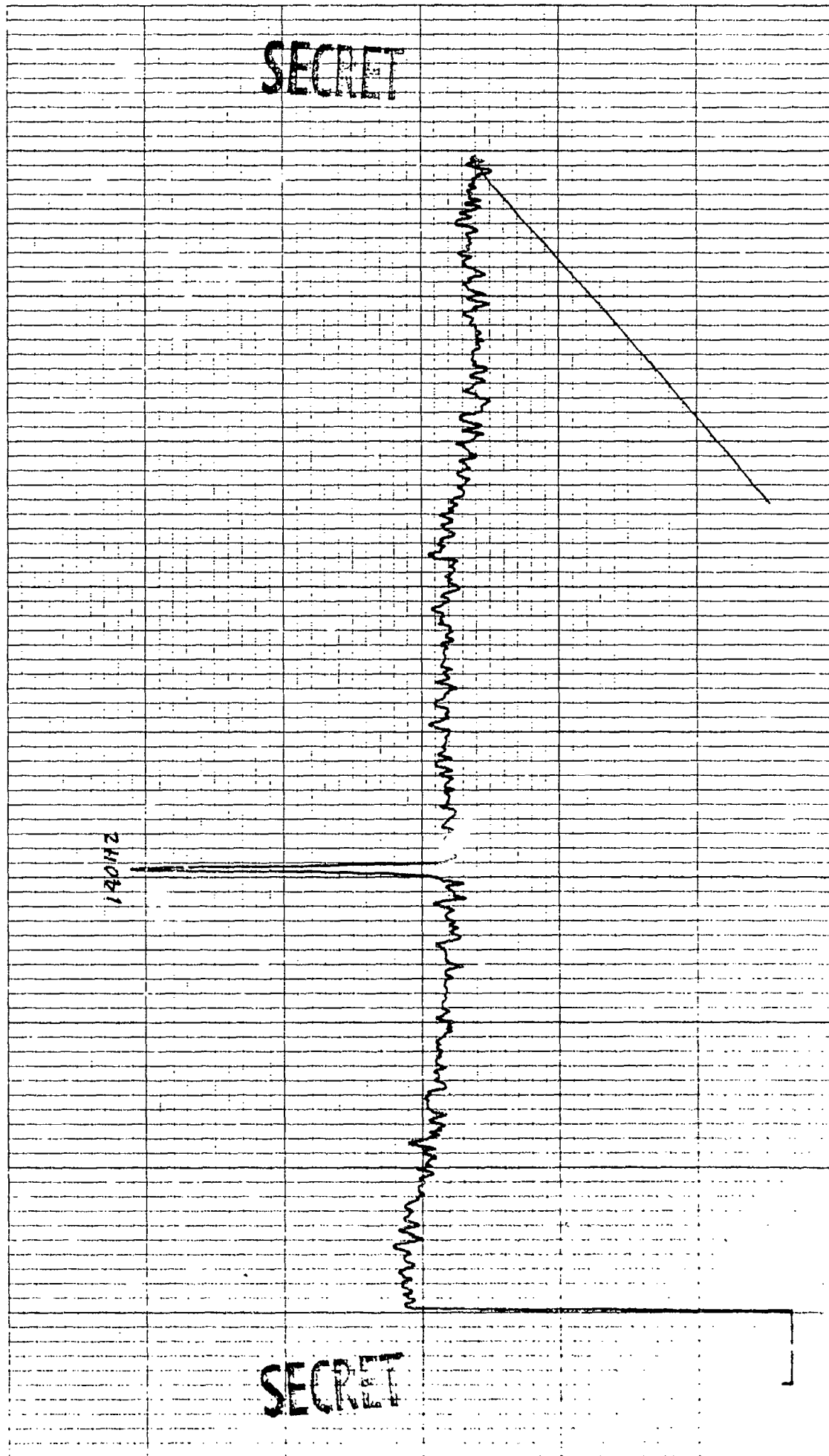
CONTROL: 2-8 -0202 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: - DB



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CONTROL: 2-8 -0202 (34)
QMI SPECTRUM/ELEMENT 10
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z

ANALYSIS BANDWIDTH: 11/19HZ
DEG AZ STEERING

REEL: F29

INDEX 1145

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

140HZ

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1. 140HZ
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3. 11/19 HZ
4. 320 SECS
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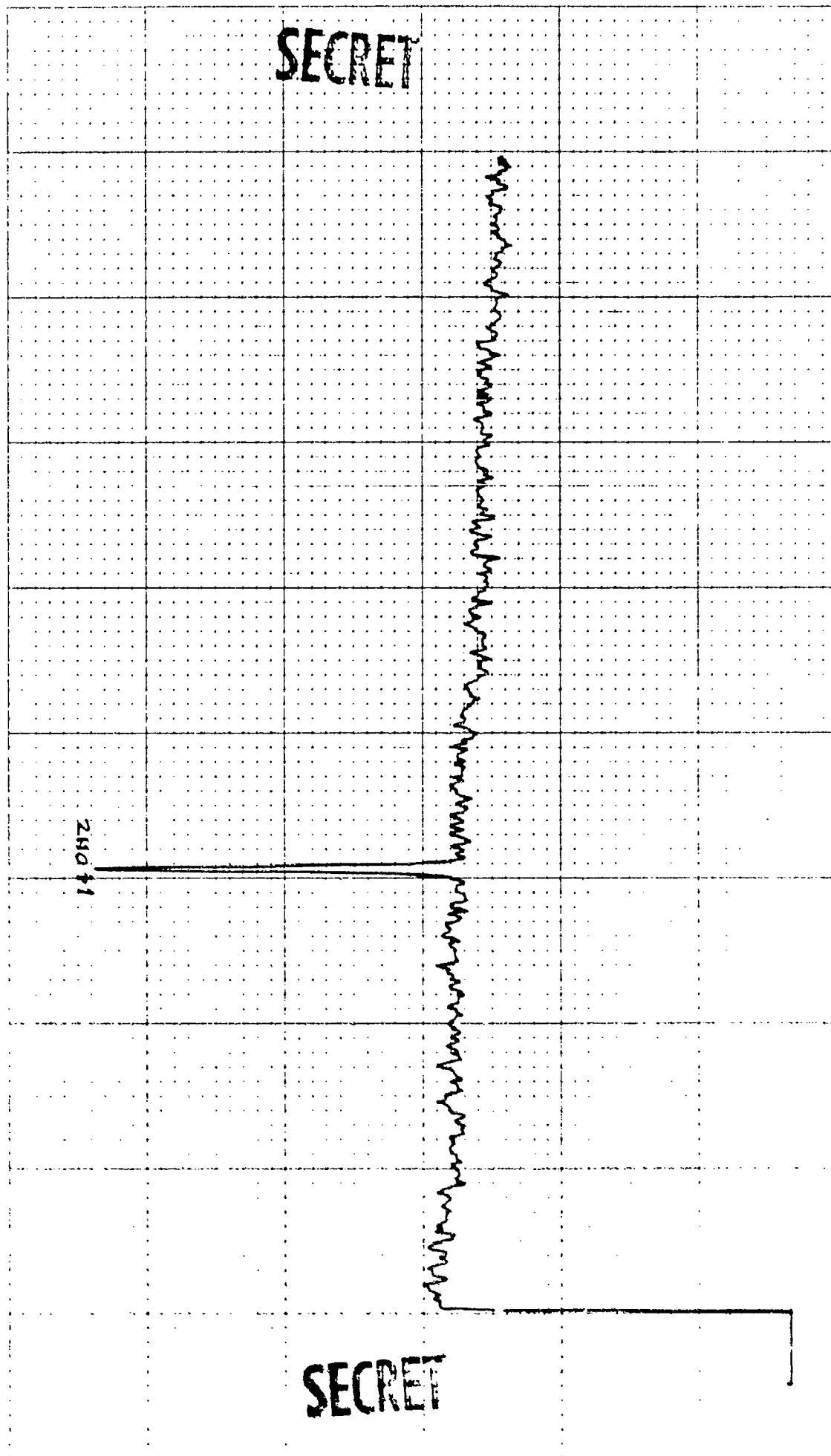
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CONTROL: 2-0 - 0202 (35)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
~ DEG AZ STEERING

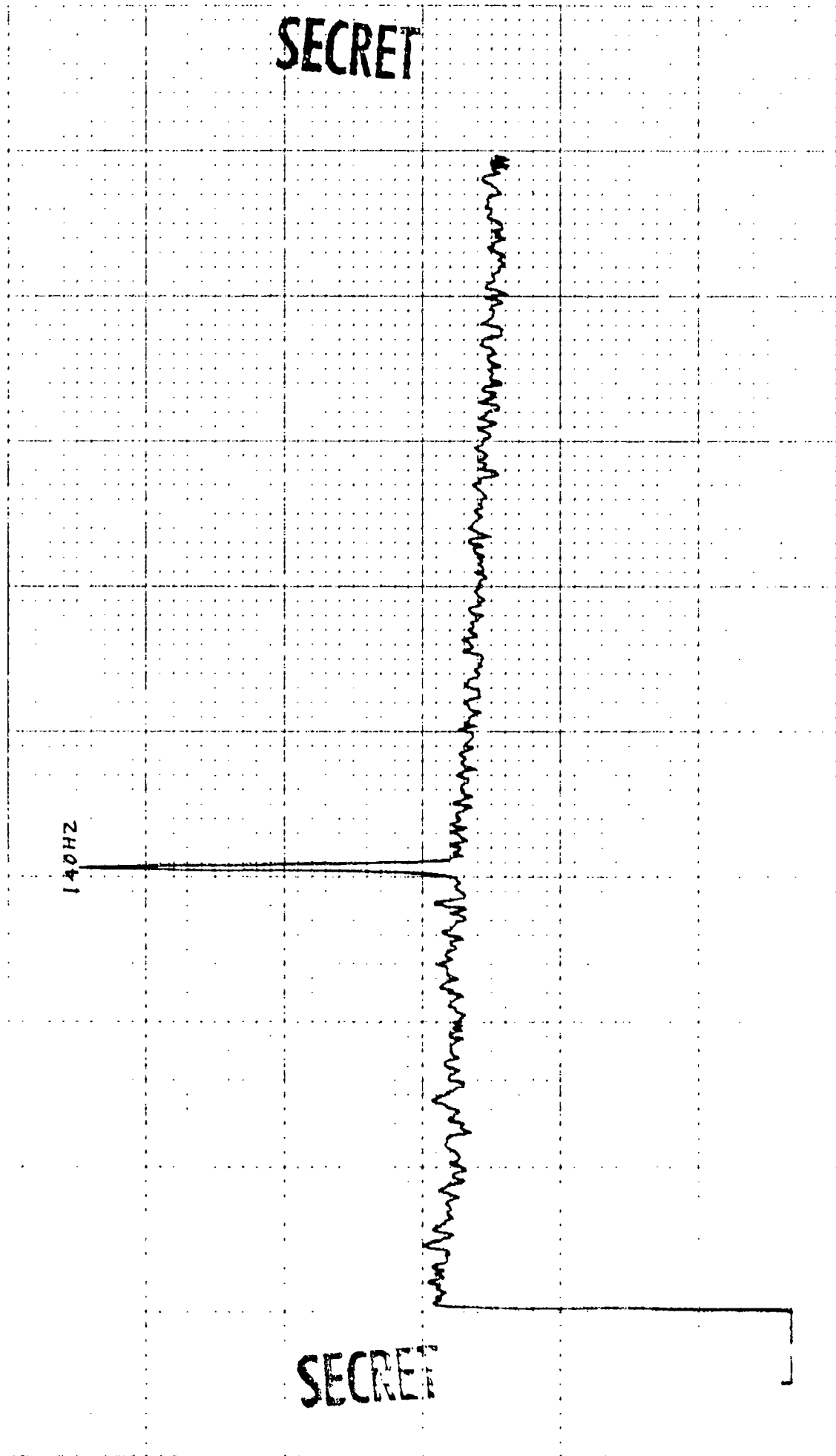
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INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



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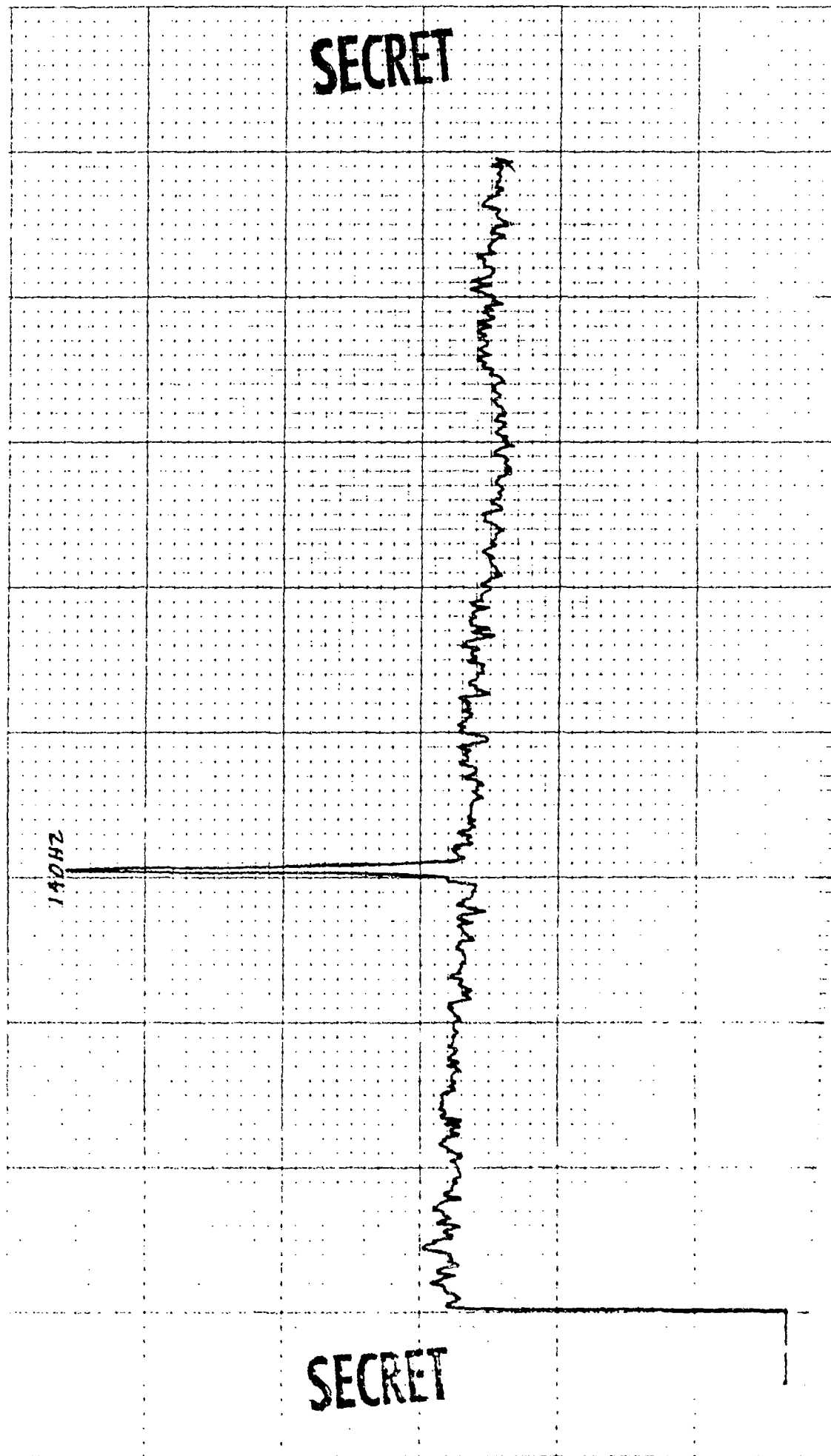
CONTROL: 2-8-0202(36) INDEX: 1145
OMNI SPECTRUM(ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
DATE OF ANALYSIS:
DATE/TIME: 2-8-77 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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HEAD PLATE TO THE RIGHT

CONTROL: 2-8-0202 (37) DATE OF ANALYSIS: REEL: F29 INDEX: 1145
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ 1 ELEMENT
DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: DB
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
— DEG AZ STEERING



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CONTROL: 2-0 - 0202 (38)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ SIEERING

REEL: F29

INDEX 1145

INTEGRATION TIME 320 SECS

ATTEN: - DB
FILTER WTG: HANNING

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REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z

DATE/TIME: 28-77-0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: — DB
 FILTER WTC: HANNING

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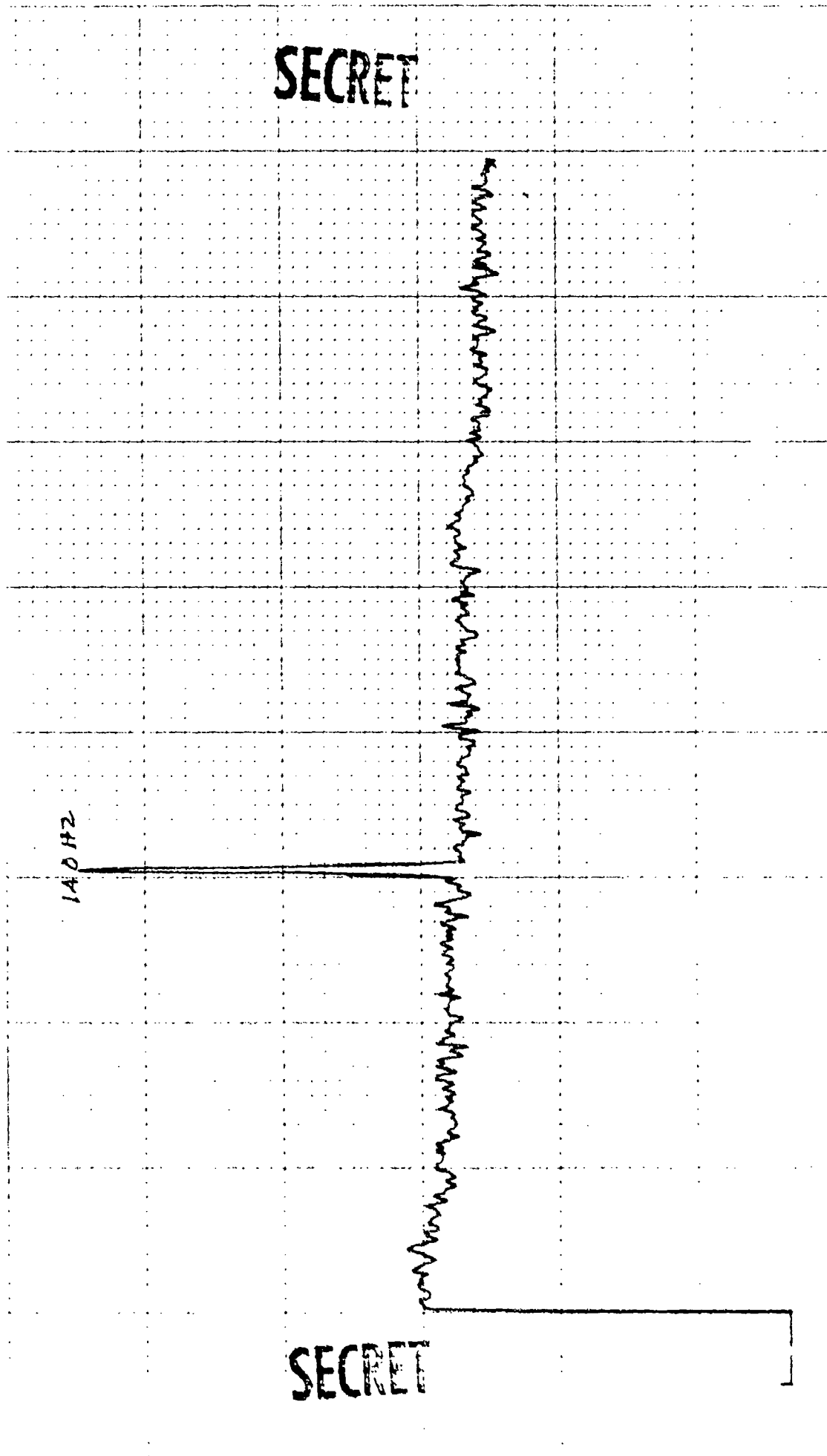
CONTROL: 2-8-0202 (40)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



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CONTROL: 2-8-0202 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FRQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F29

INDEX: 145

INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTG: HANNING

140HZ

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CONTROL: 2-8-0202 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX 145

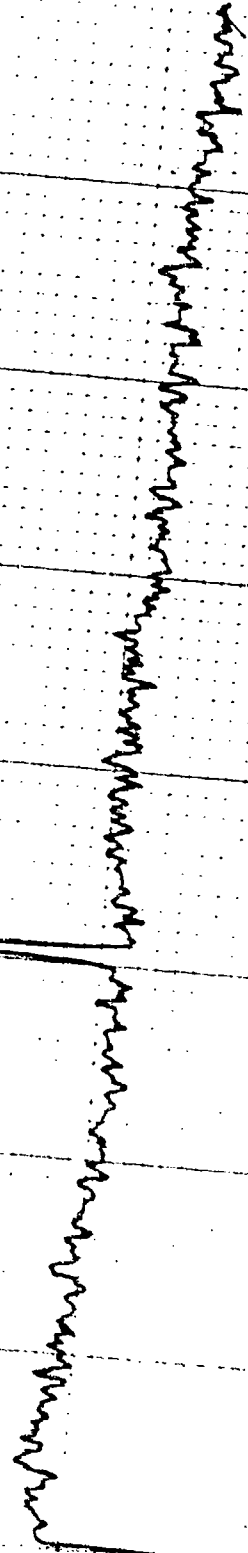
INTEGRATION TIME 320 SECS
FILTER

ATTEN: — DB
WTC: HANNING

140 HZ

SECRET

SECRET



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1402 2-8-72 0202Z

CONTROL: 2-8-0202(43)
OMNI SPECTRUM ELEMENT 35
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-72-0204Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC 1/2 STEERING

REEL: F29

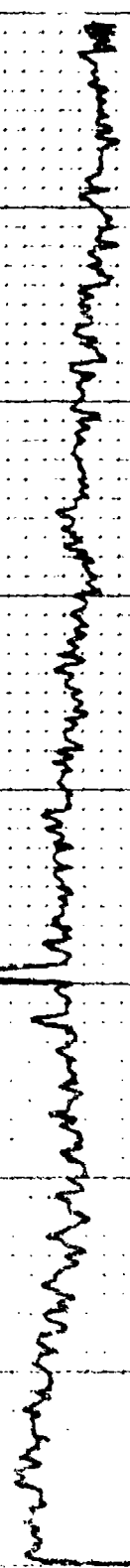
INDEX: 145

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTC: HANNING

SECRET

SECRET

1402Z



46 0703

CONTROL: 2-8 - 0202 (44)
OMNI SPECTRUM/ELEMENT 37
EXERCISE: BEARING STAKE
CENTER FREQ: 160 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: F2-9 INDEX: 1145

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING

140HZ

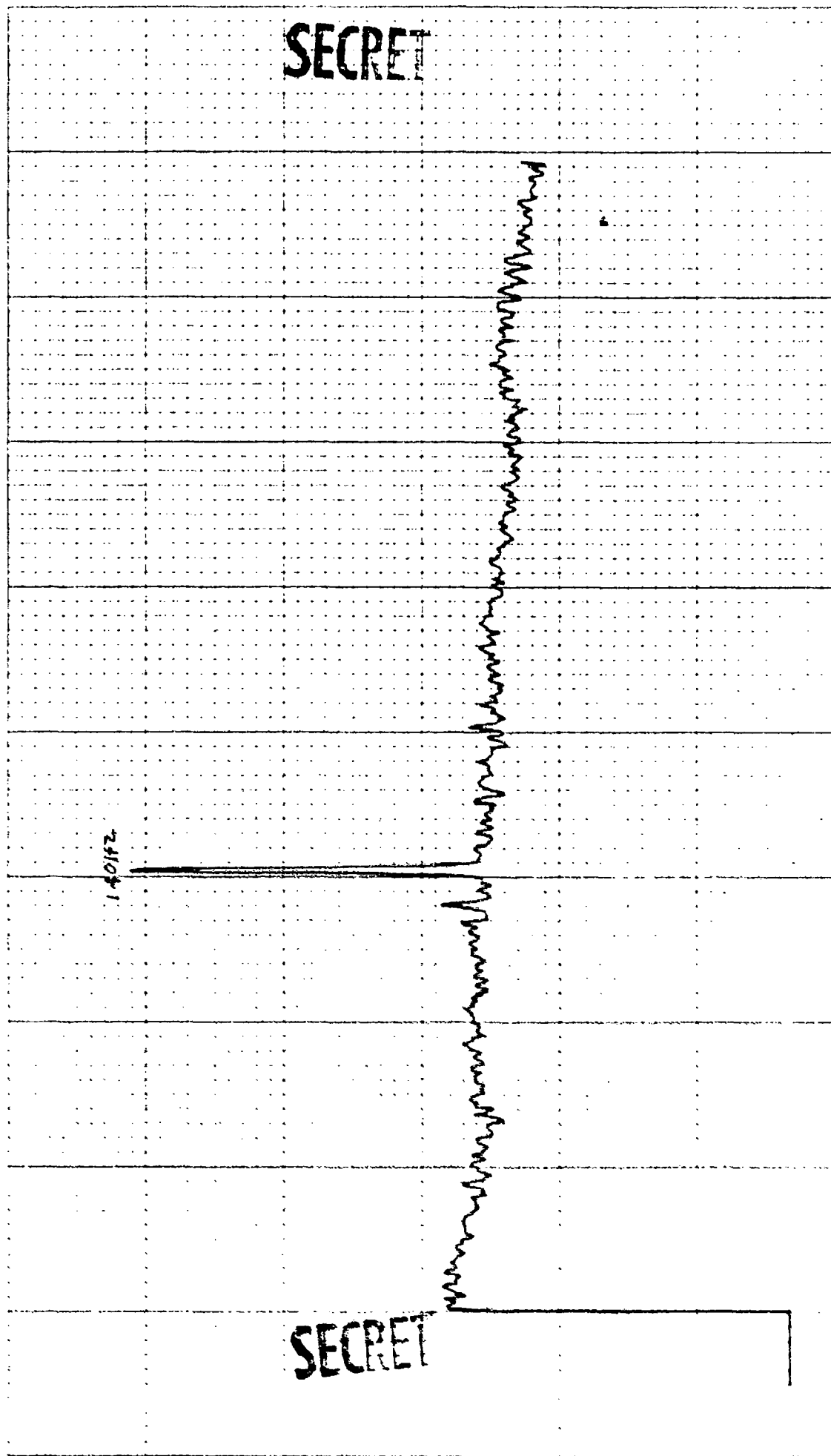
SECRET

SECRET

46 0703

CONTROL: 2-8-0202(45) DATE OF ANALYSIS: REEL: F29 INDEX 1/45
OMNI SPECTRUM(ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
1 ELEMENT
INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING



46 0703

CONTROL: 2-8 -0202 (41)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER: WTC: HANNING

140 HZ

SECRET

SECRET

45 0703

10 X 10 TO THE INCHES
REUTEL & ESSER CO. WILKINSON

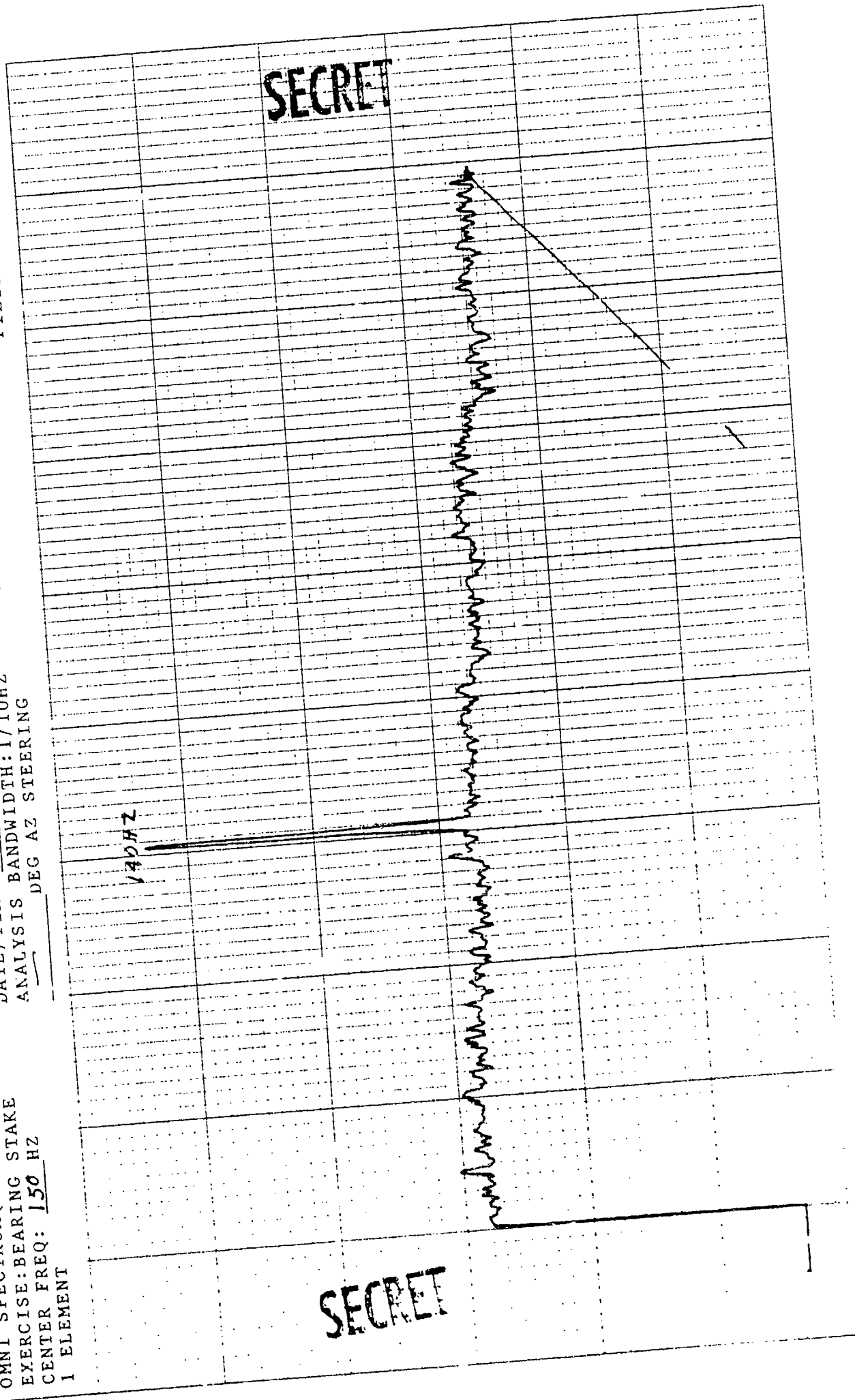
REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

CONTROL: 2-8 - 0202 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTG: HANNING



46 0703

CONTROL: 2-8 -0202 (48)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
- DEG AZ STEERING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

140 HZ

SECRET

SECRET

46 0703

CONTROL: 2-8 -0202 (49)
OMNI SPECTRUM(ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z

ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F29

INDEX 1145

INTEGRATION TIME 320 SECS

FILTER

ATTEN: — DB

WTG: HANNING

140HZ

SECRET

SECRET

46 0703

1500 1000 TO THE RIGHT: 1000 1000

CONTROL: 2-8 -0202(50)
OMNI SPECTRUM(ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

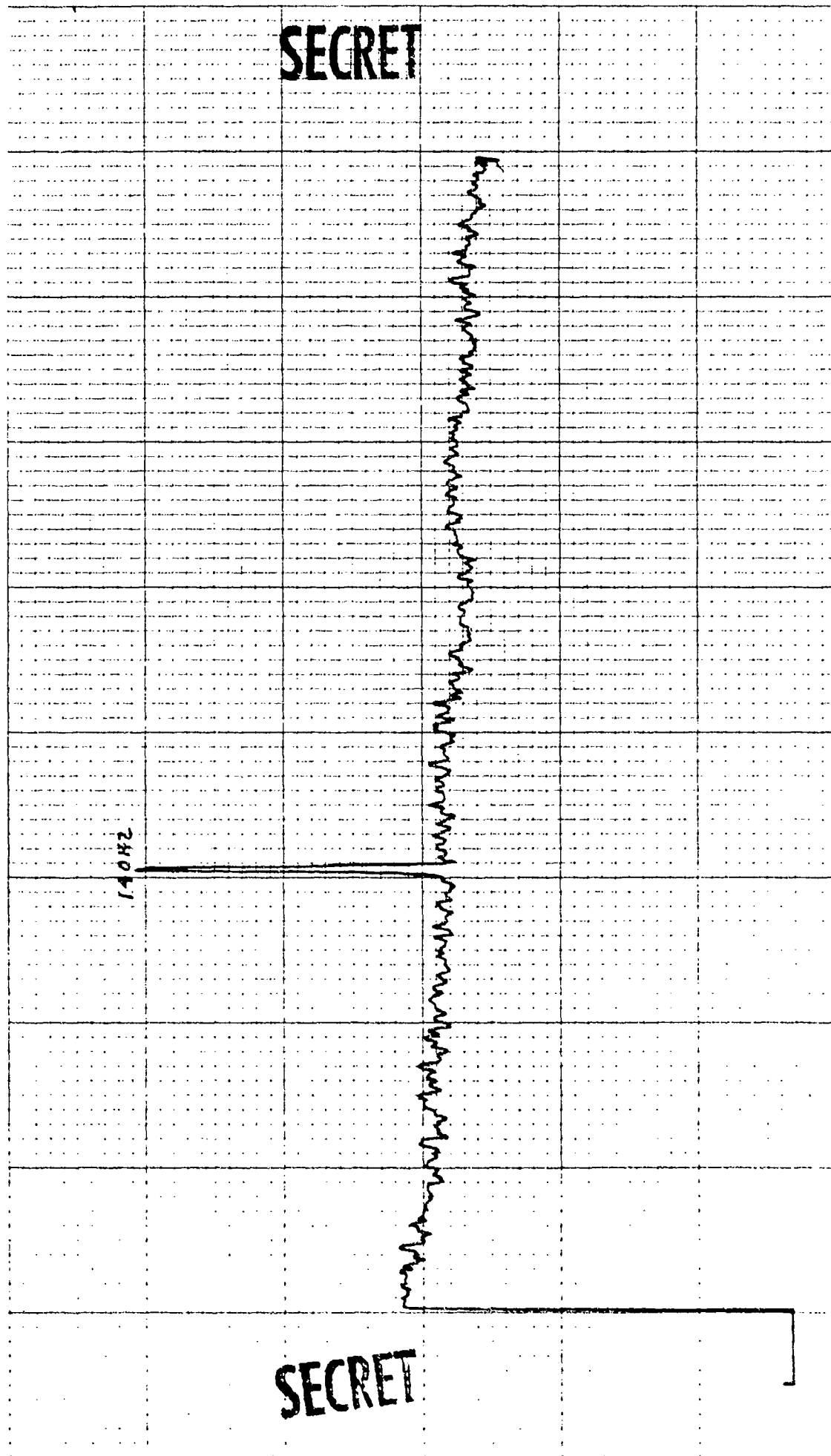
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX 1145

INTEGRATION TIME 320 SECS
FILTER
ATTN: — DB
WTG: HANNING



46 0703

NOTE: PLOT TO THE RIGHT OF THE PAGE

CONTROL: 2-8-0202 (51)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F29 INDEX 1149

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET

46 0703

140 Hz TO THE RIGHT OF THE CENTER

CONTROL: 2-8 -0202 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER
ATTEN: ~ DB
WTG: HANNING

140 HZ

SECRET

SECRET

46 0703

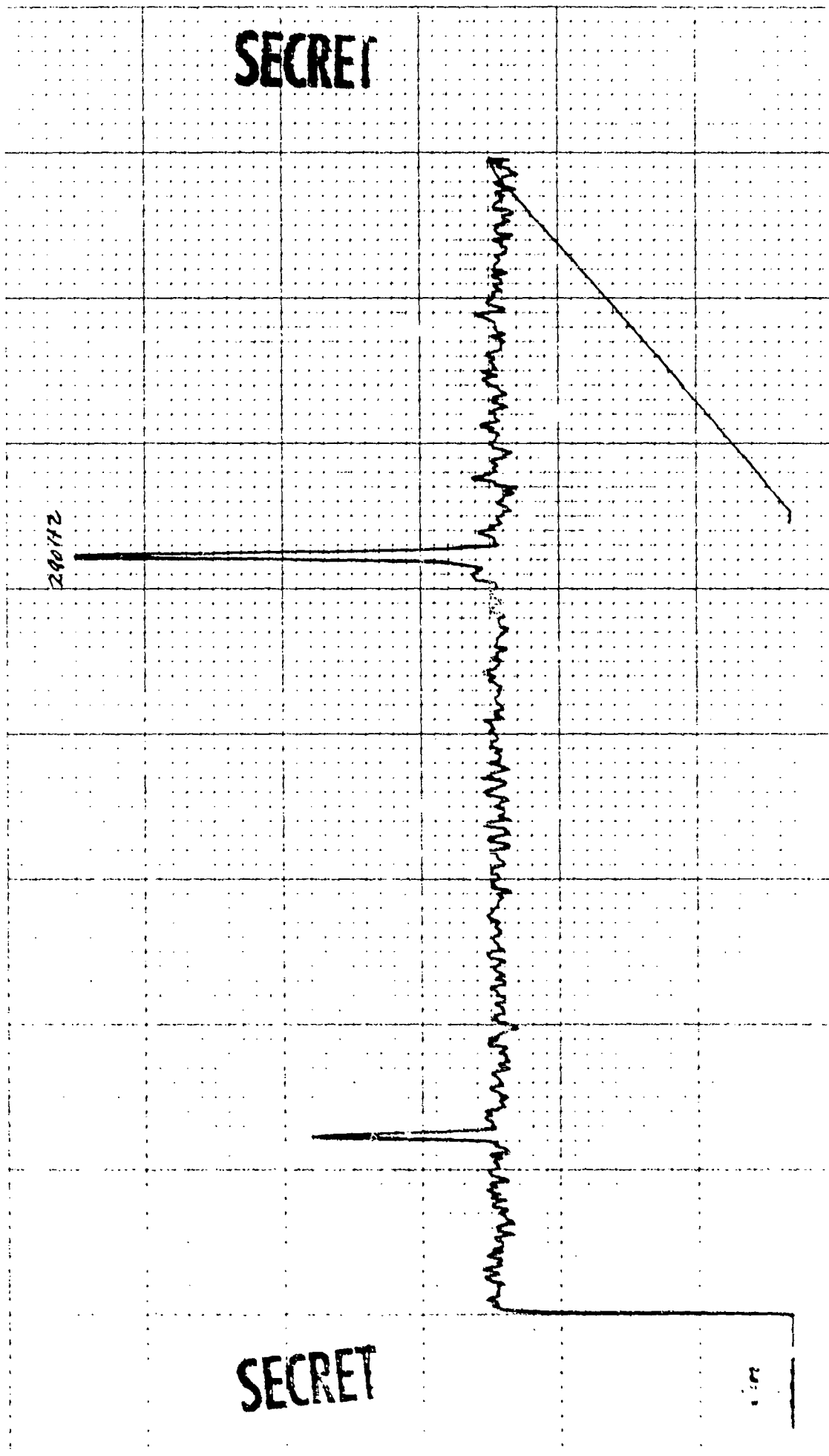
1402 1400 1400 1400 1400

CONTROL: 2-8 - 0202 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

PEEL: F29
INDEX: 1148

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



46 0703

INDEX 1145

REEL: F29

ATTN: DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS:

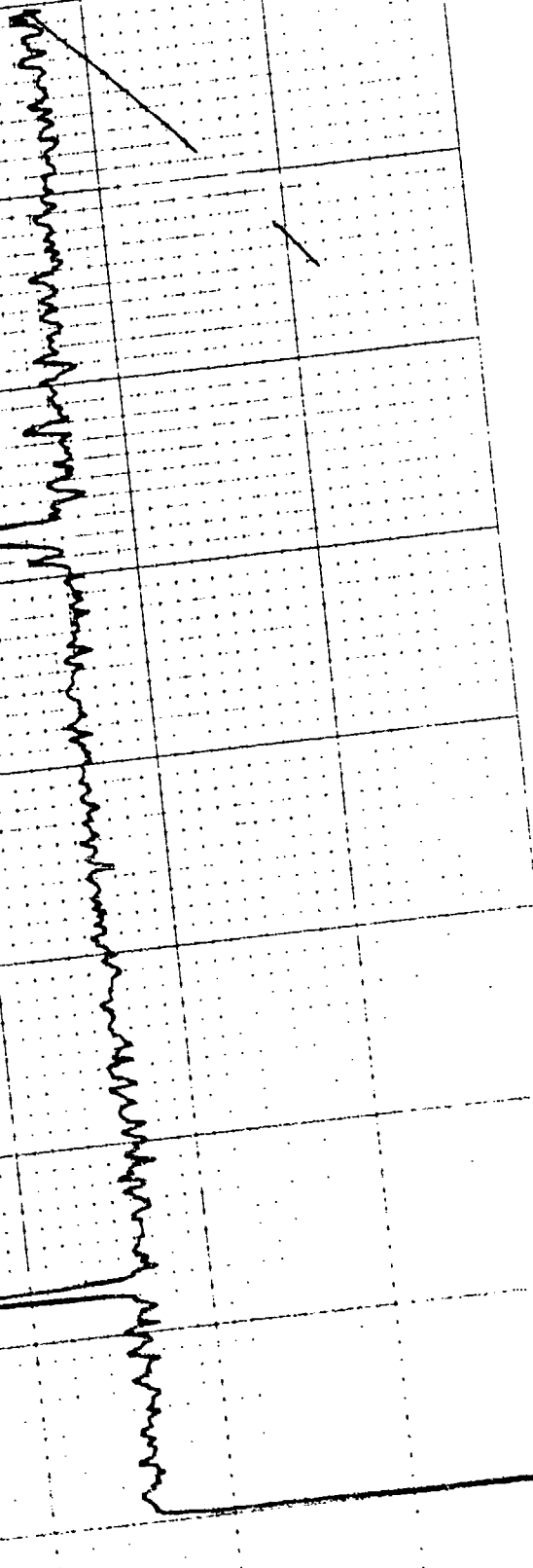
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

CONTROL: 2-8-0202 (2)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

SECRET

SECRET

280 HZ



46 0703

10-27 10:00 AM TO THE DEPT. OF DEFENSE

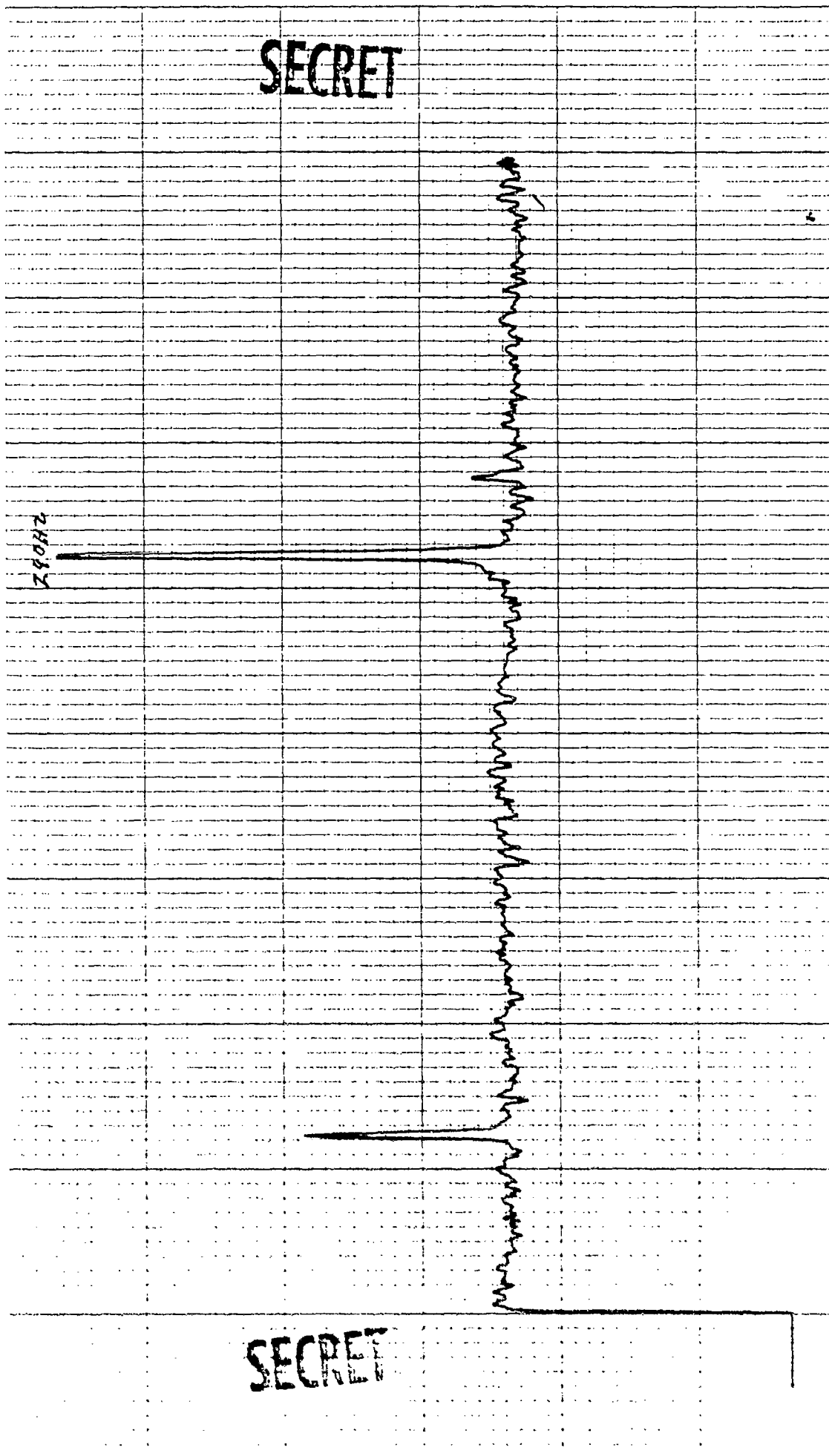
CONTROL: 2-8 - 0202 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 145

INTEGRATION TIME 320 SECS
FILTER
ATTN: — DB
WTC: HANNING



REF: 2-8-77 TO DB 1000: 2-8-77

46 0703

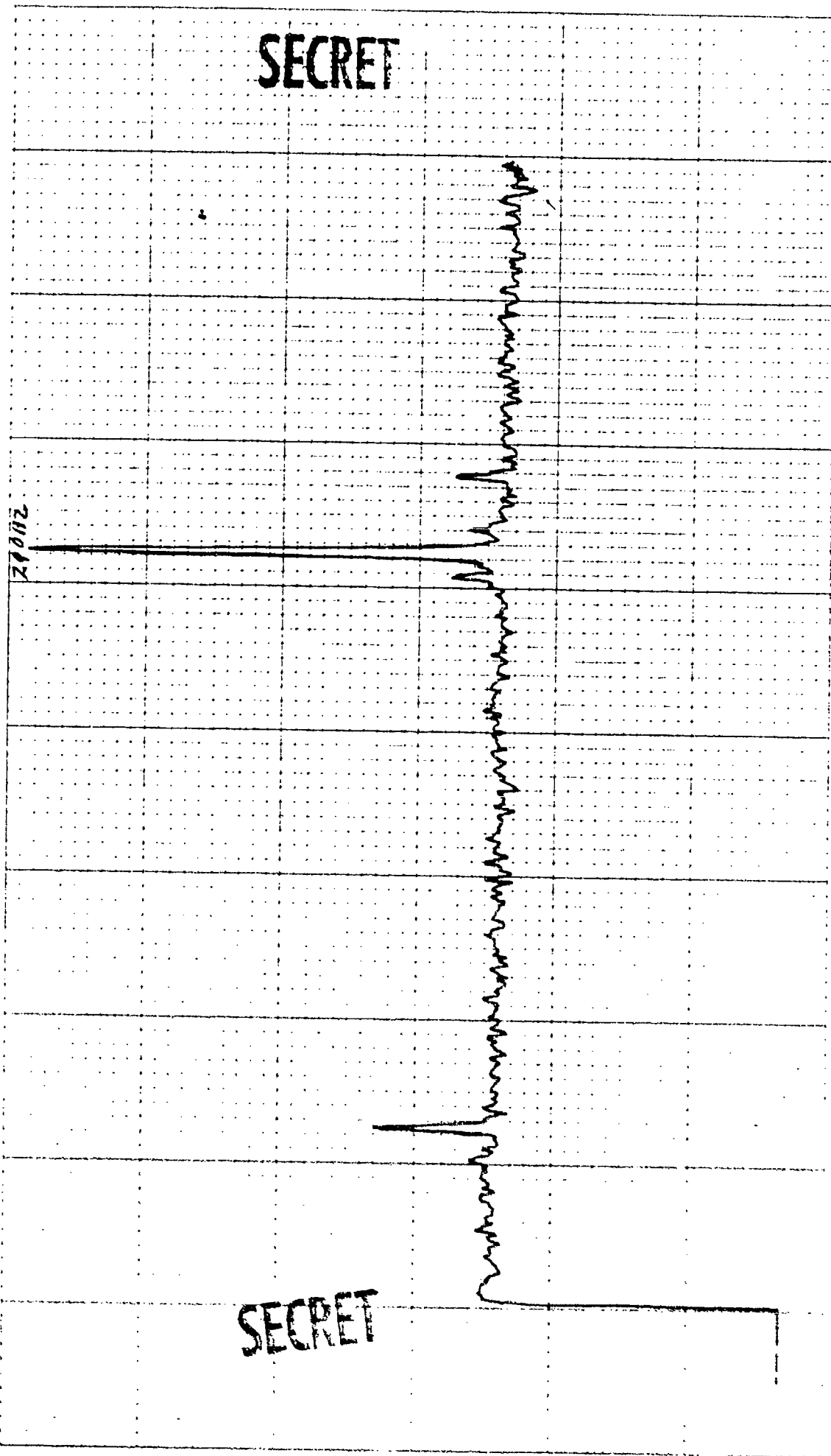
CONTROL: 2-8 -0202 (4)
OMNI SPECTRUM(ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 1/45

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

... ..

DATE 46 31 49

DATE/TIME: 2-8-77 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

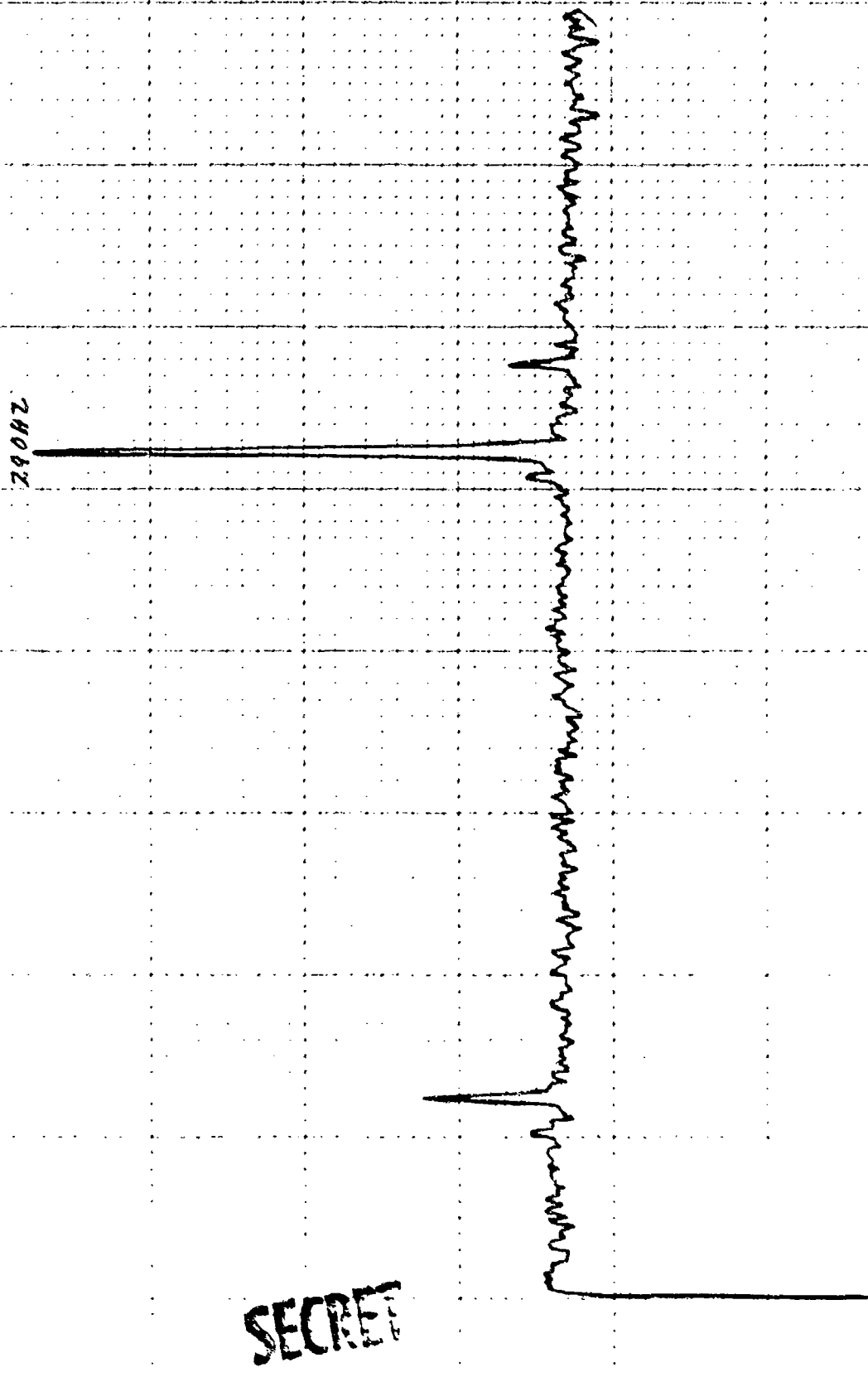
REF: 129

541/ХЭДИ

INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTC: HANNING

SECRET

SECRET



46 0703

102 2000 1000 1000 1000 1000

CONTROL: 2-0 - 0202 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-0-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F2-9

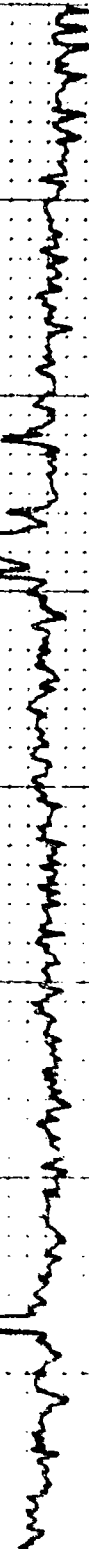
INDEX 1145

INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTG: HANNING

290HZ

SECRET

SECRET



46 0703

147. 5.4.1. 1.1.1. 1.1.1. 1.1.1.

CONTROL: 2-8-0202 (7)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

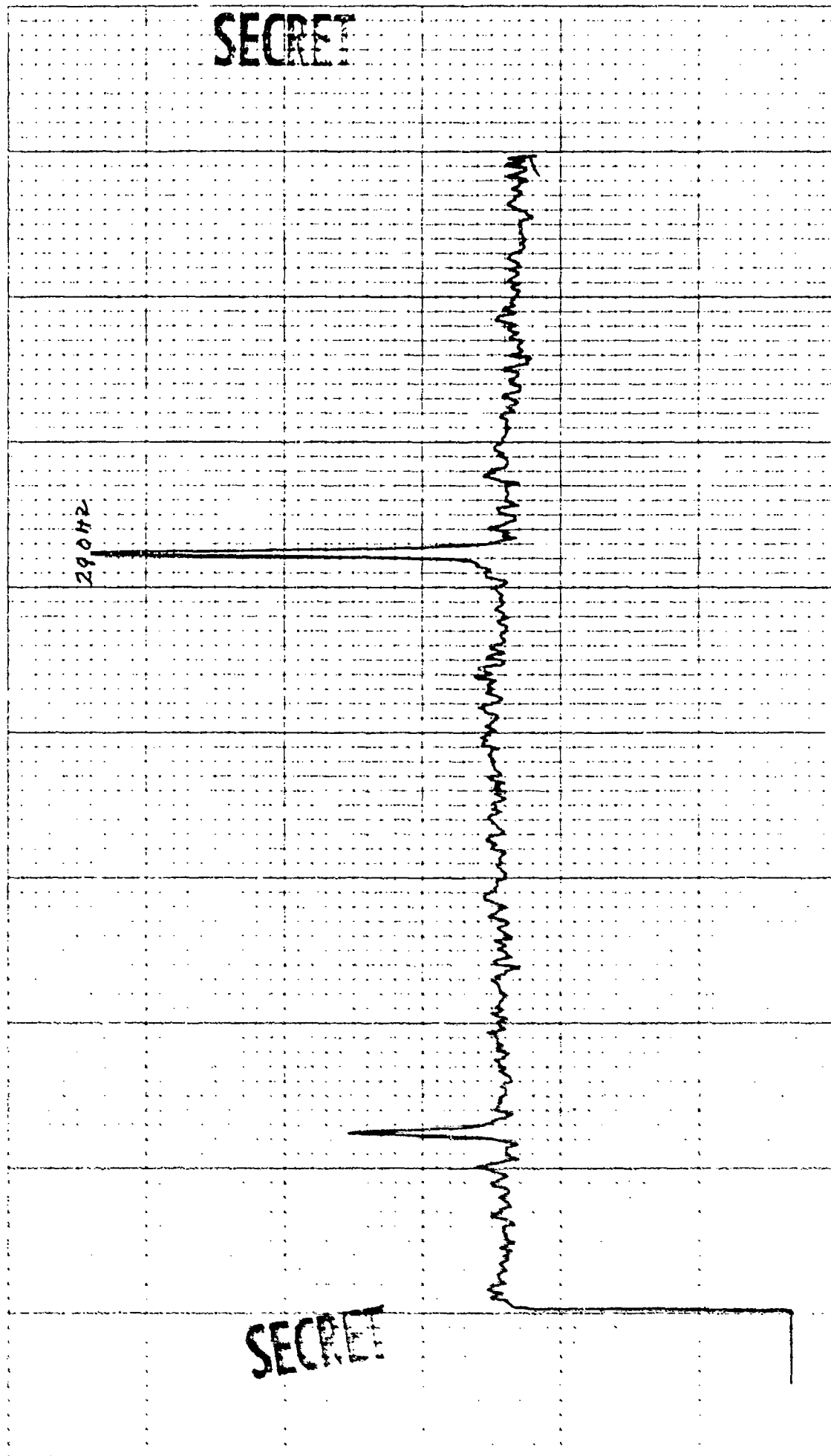
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F21

INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTC: HANNING



46 0703

CONTROL: 2-8 -0202 (8)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

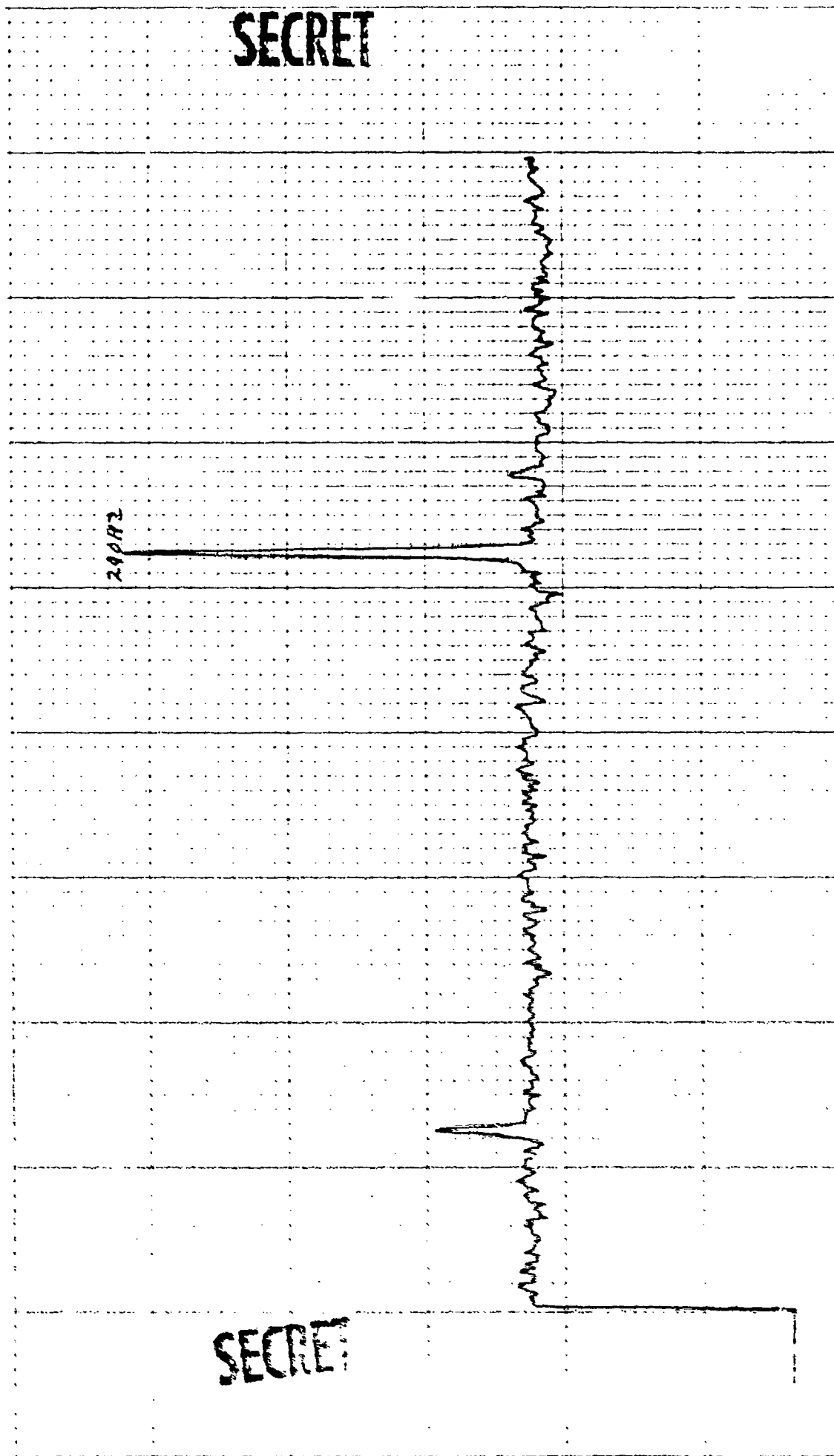
REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: - DB

280 HZ

SECRET

SECRET



46 0703

POE 0000 0000 0000 0000

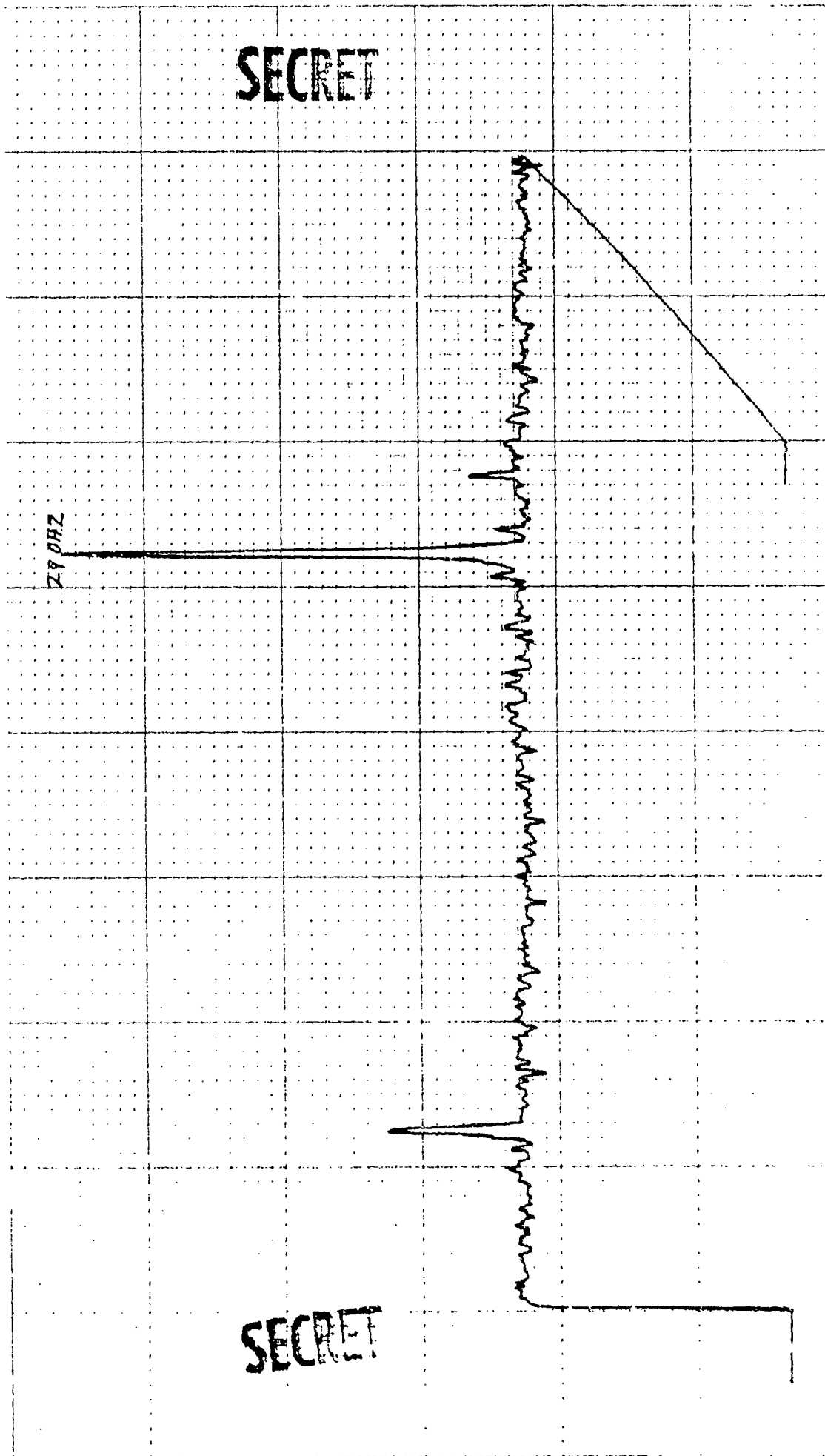
CONTROL: 2-8 -0202 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING SIAKE
CENTER FREQ: 290 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ SLEWING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS
ATTEN: — DB
WTC: HANNING
FILTER



46 0703

CONTROL: 2-8 -0202 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING: STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

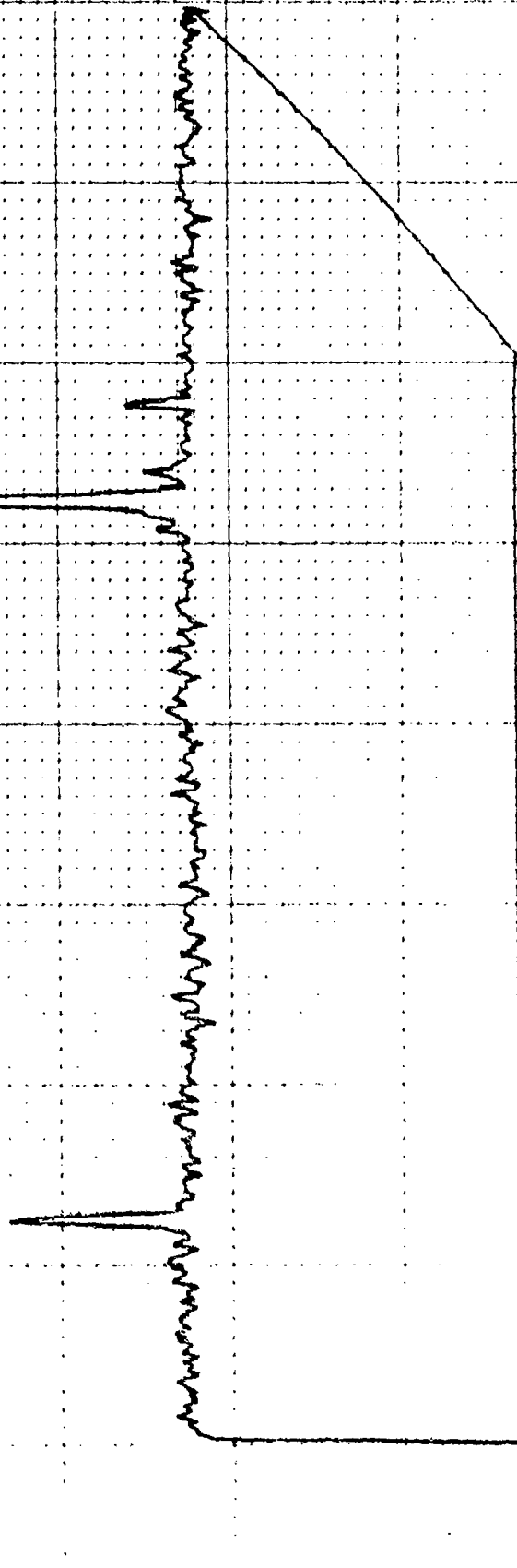
INDEX: 145

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

280 HZ

SECRET

SECRET



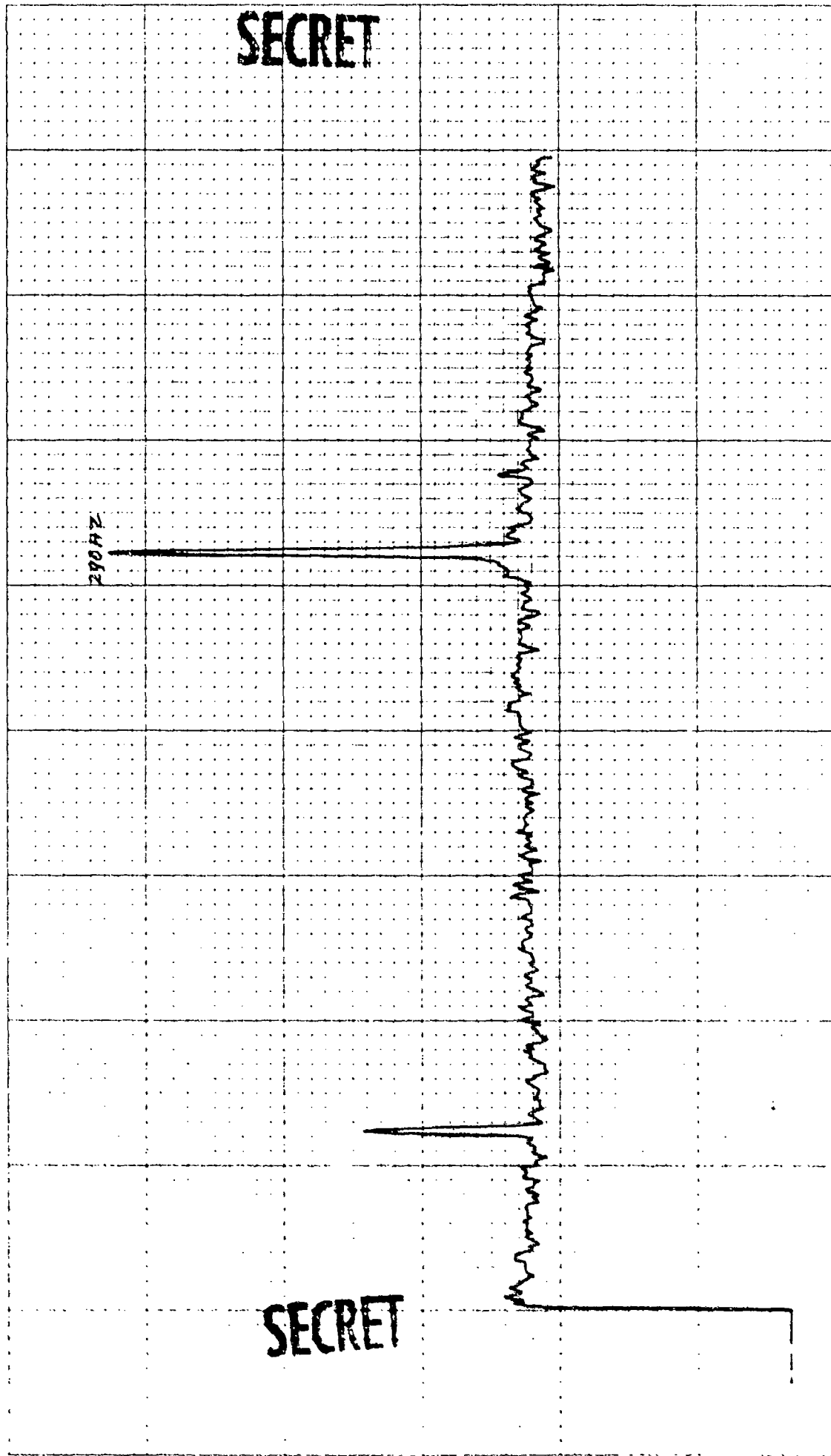
46 0703

REEL: F29 INDEX: 1145

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC A2 STEERING

CONTROL: 28 - 0202 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS
ATTN: — DB
FILTER WTG: HANNING



Page 2 of 2

46 0703

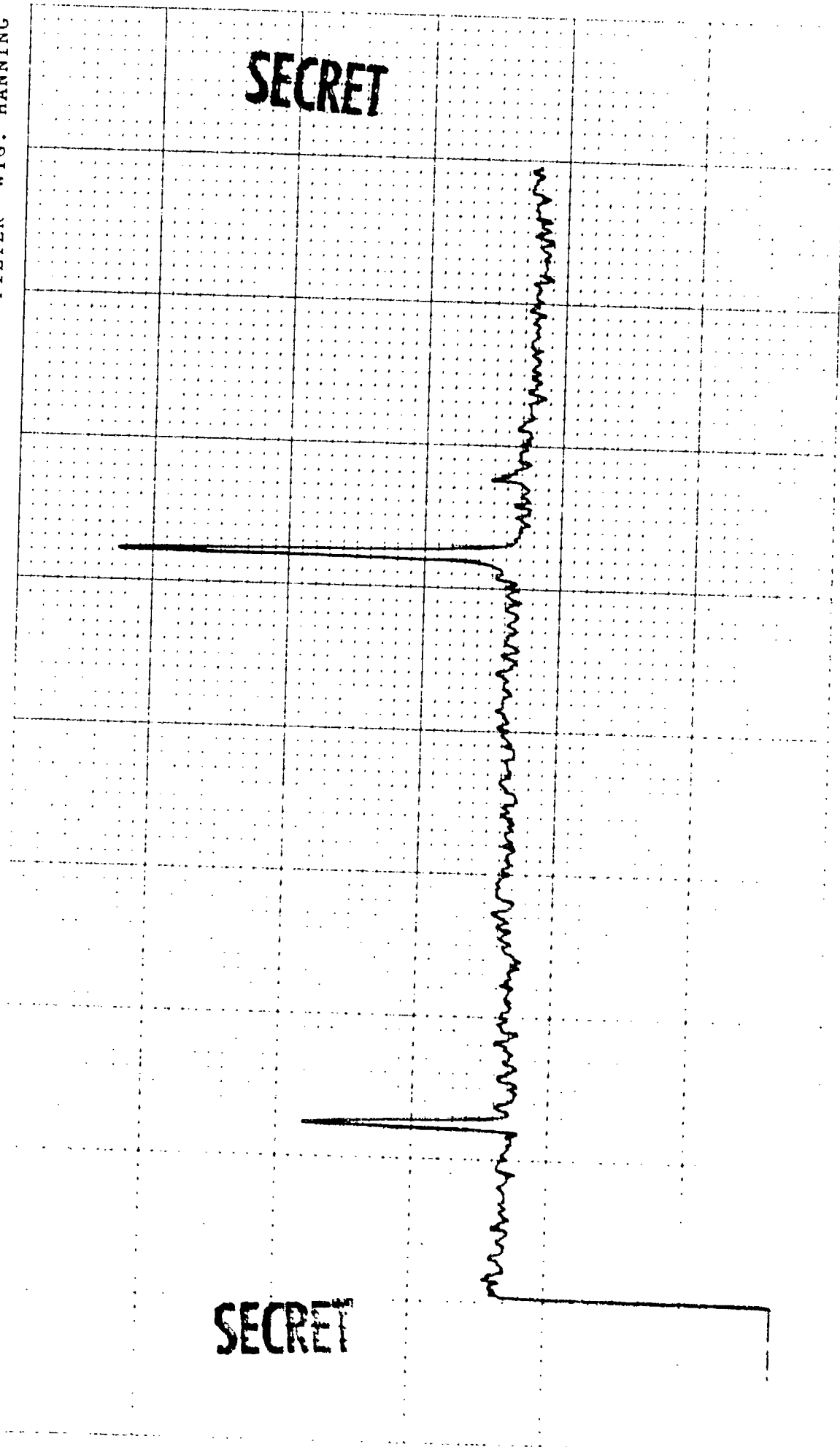
CONTROL: 2-8 -0202 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



46 0703

1452 1000 TO THE DEPT. OF DEFENSE

INDEX 1145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (13)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10 HZ

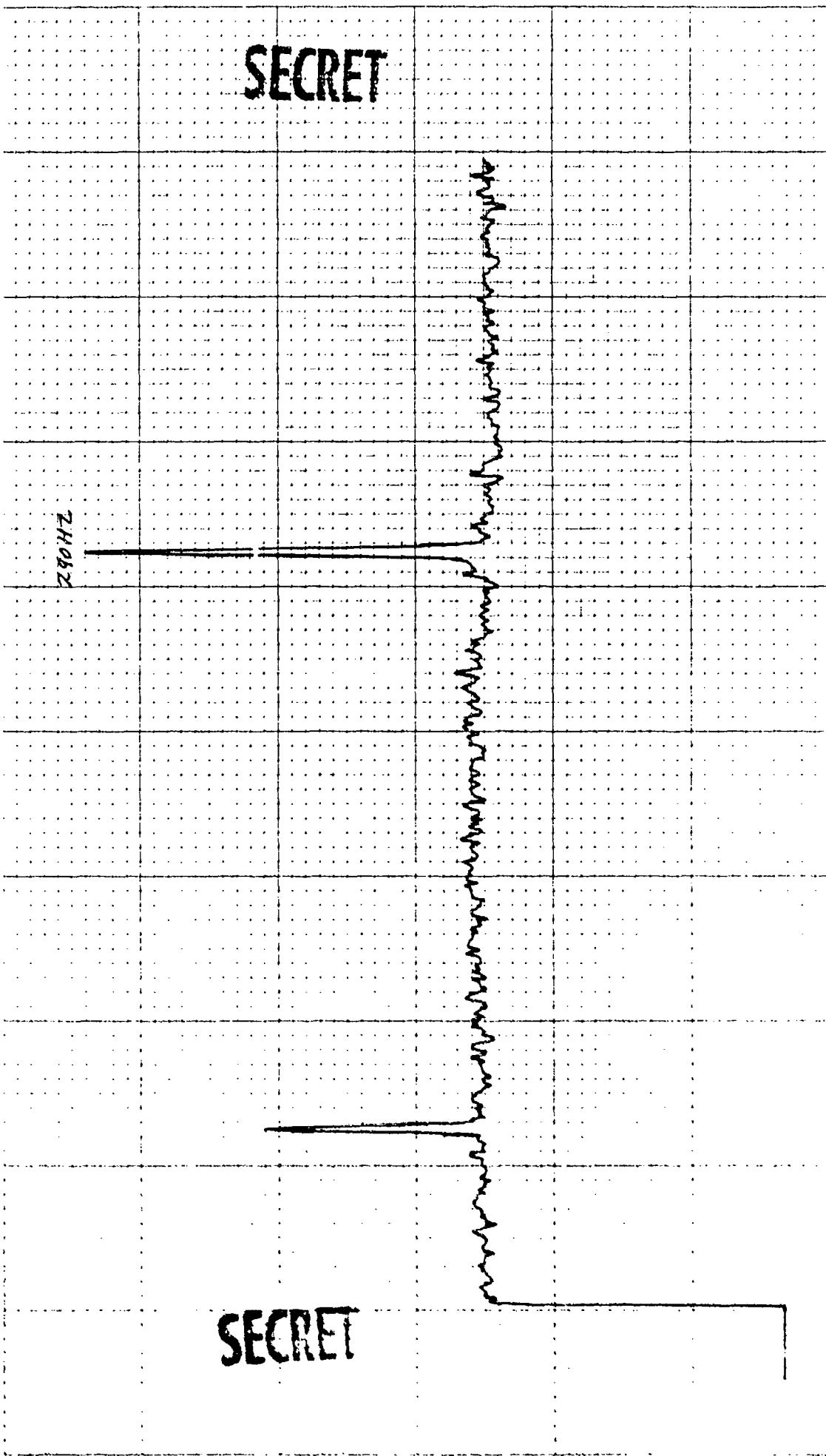
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



46 0703

1/22 10:00 TO 10:05

CONTROL: 2-8-0202 (14)
OMNI SPECTRUM(ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

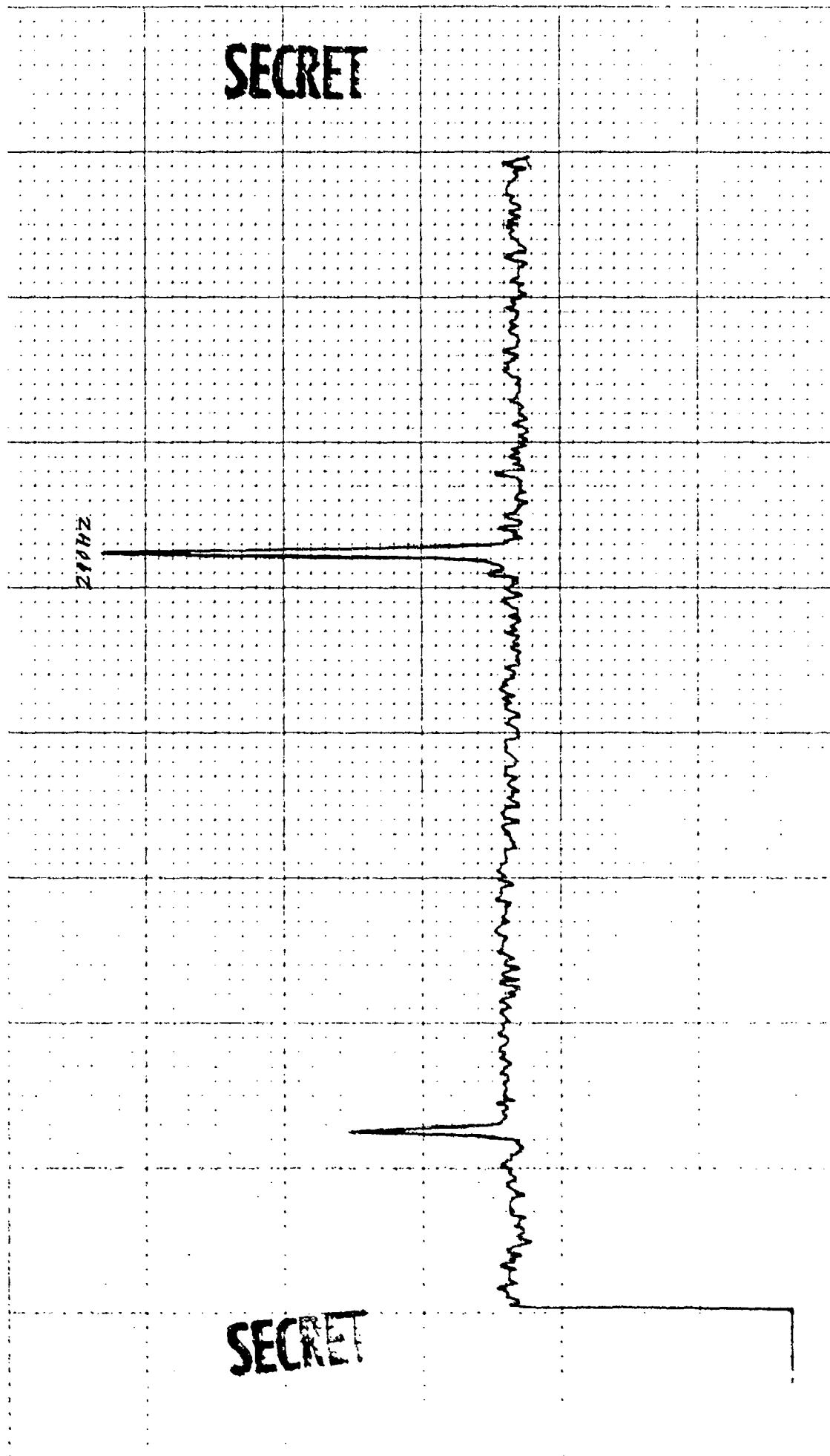
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX 1/45

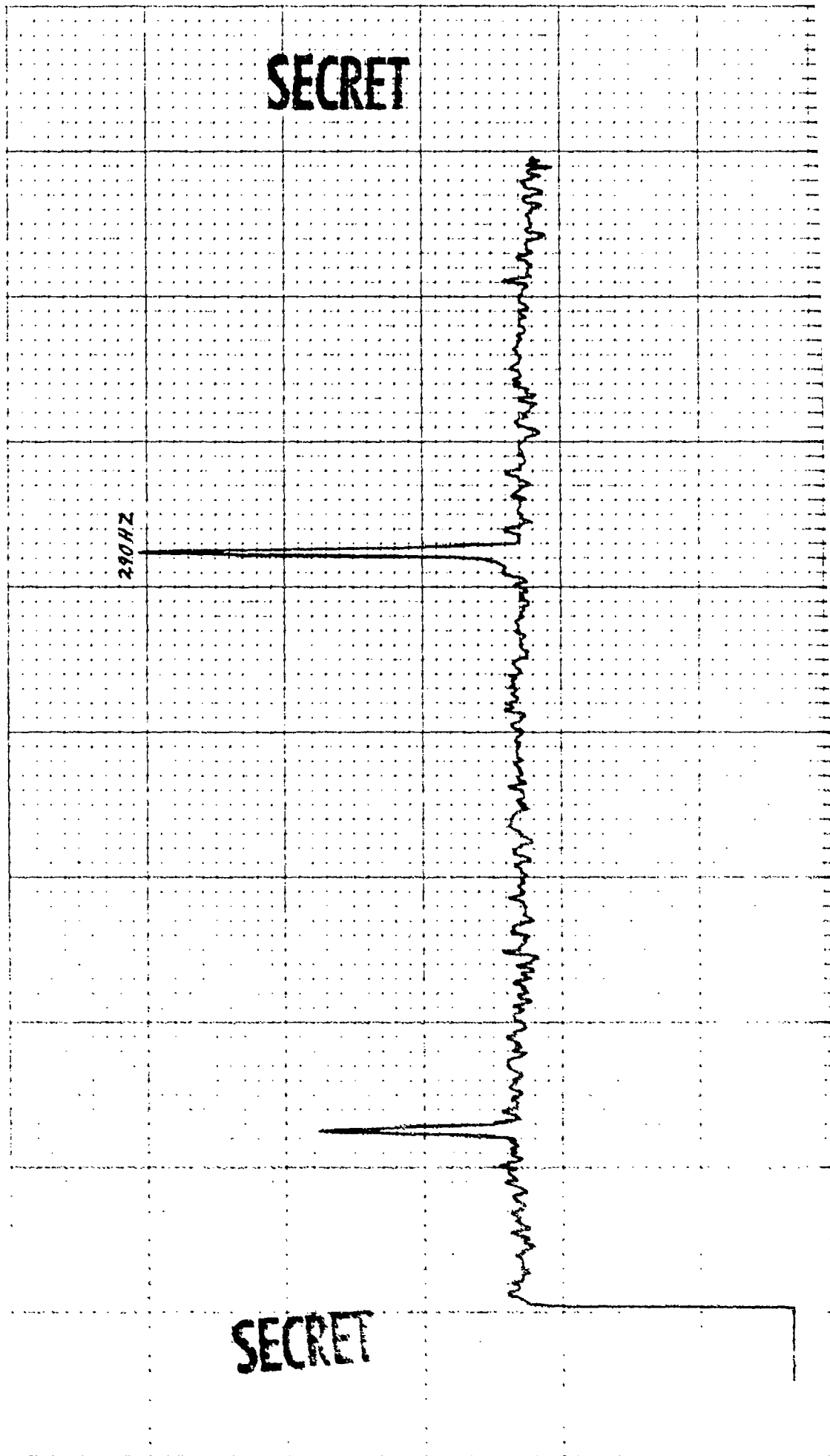
INTEGRATION TIME 320 SECS
FILTER — DB
ATTN: — DB
WTC: HANNING



46 0703

REF 2400 2400 2400 2400

CONTROL: 0202 - 51 (D07) DATE OF ANALYSIS: REEL: F29 INDEX 1145
OMNI SPECTRUM (ELEMENT 31) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: - DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ - DEG AZ STEERING



46 0703

CONTROL: 2-8 -0202 (16)
OMNI SPECTRUM ELEMENT 23
EXERCISE: BEAPING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

PEEL: F29

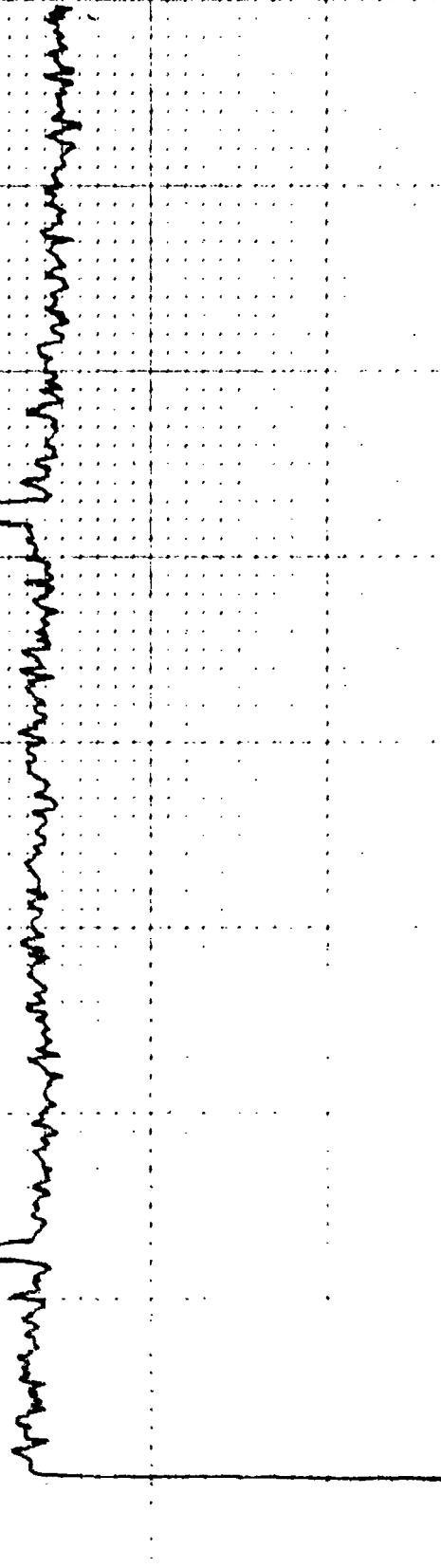
INDEX: 1145

INTEGRATION TIME 320 SECS
FILTIER
ATTEN: — DB
WTG: HANNING

290 HZ

SECRET

SECRET



1000 10.4.40 TO THE HIGH: 10.4.40

46 0703

CONTROL: 2-8-0202(17)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

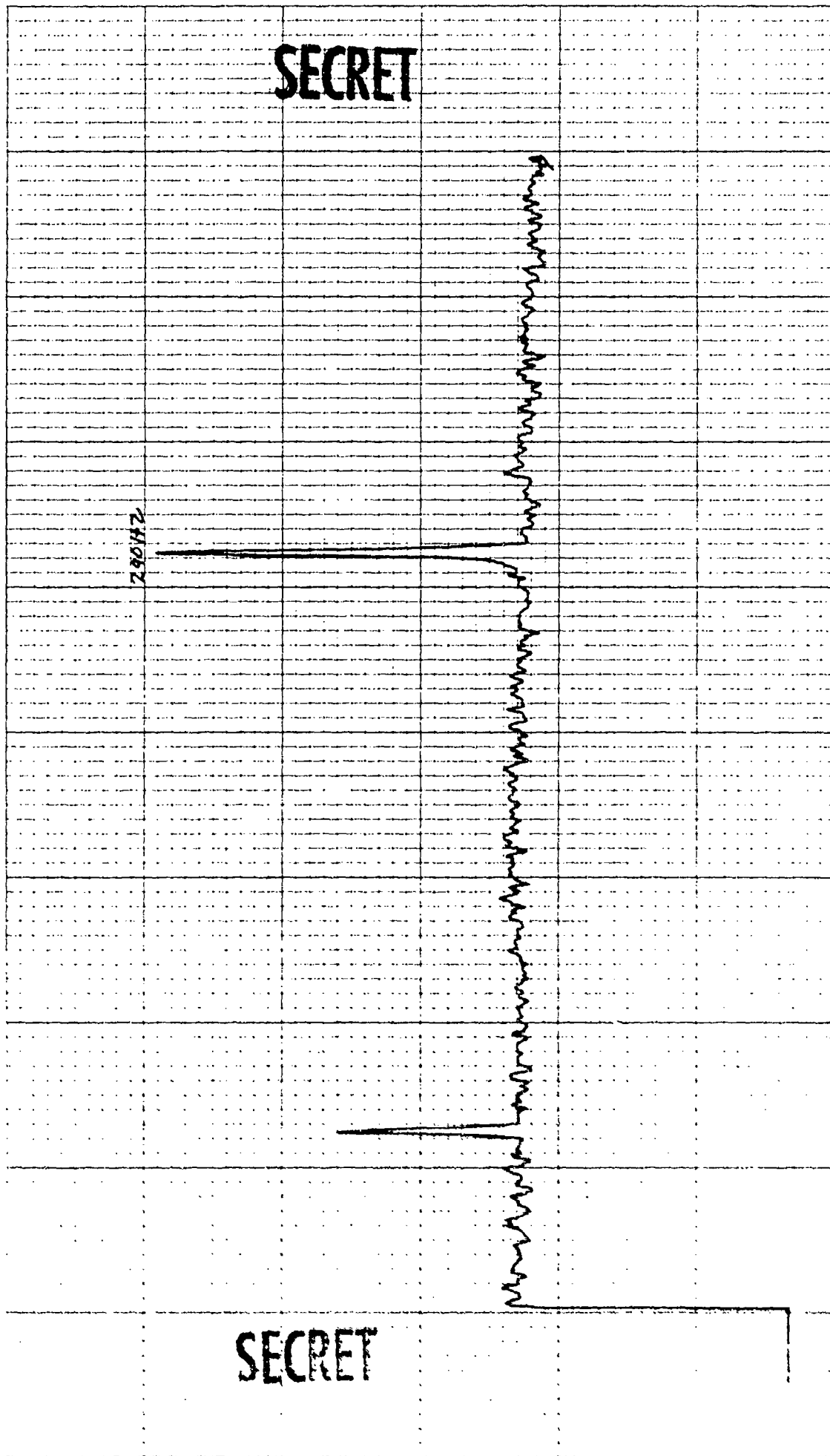
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX: 1045

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WTG: HANNING



46 0703

REF 2-8-77 0202Z

CONTROL: 2-8 -0202 (18)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z

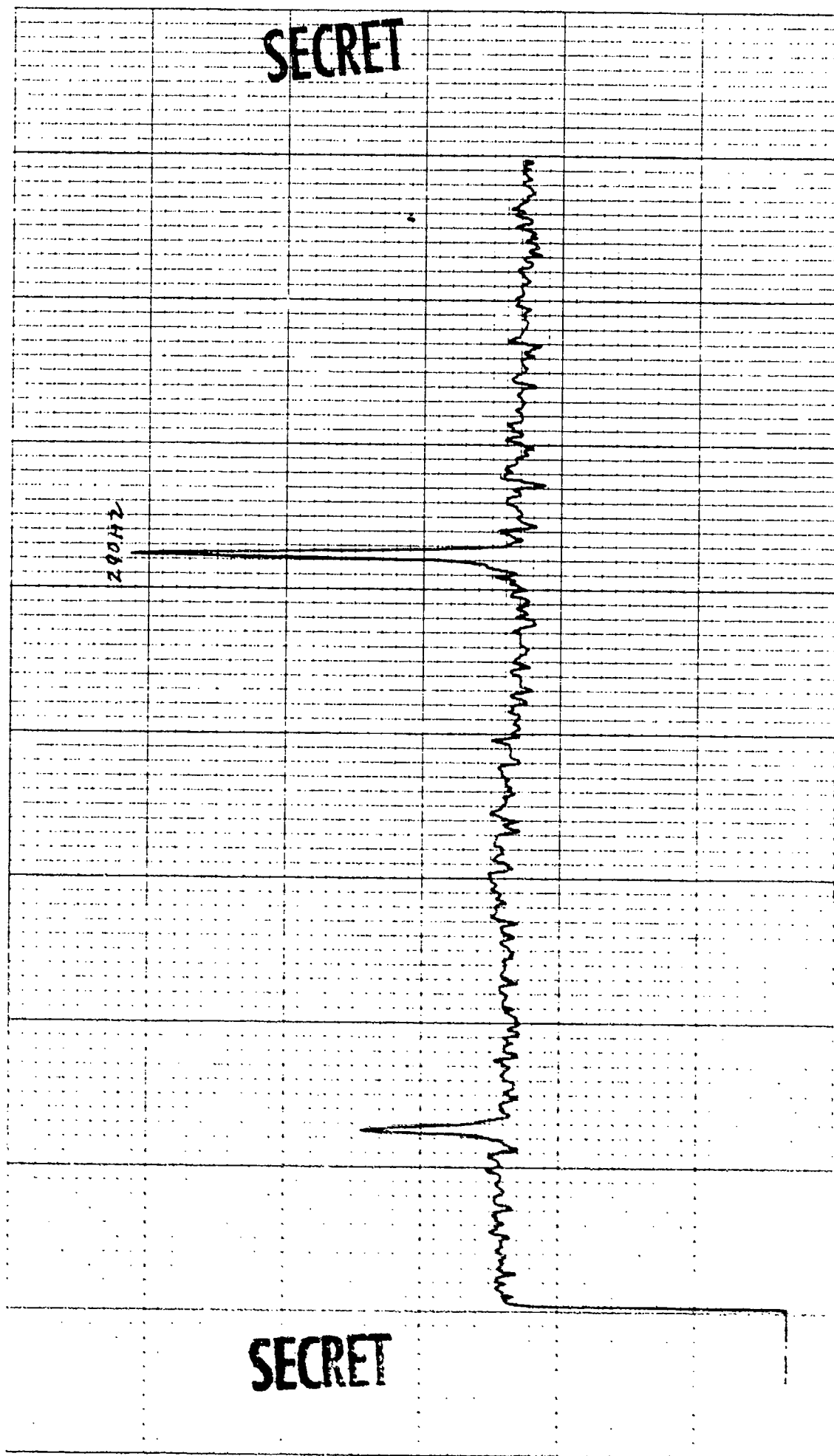
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER

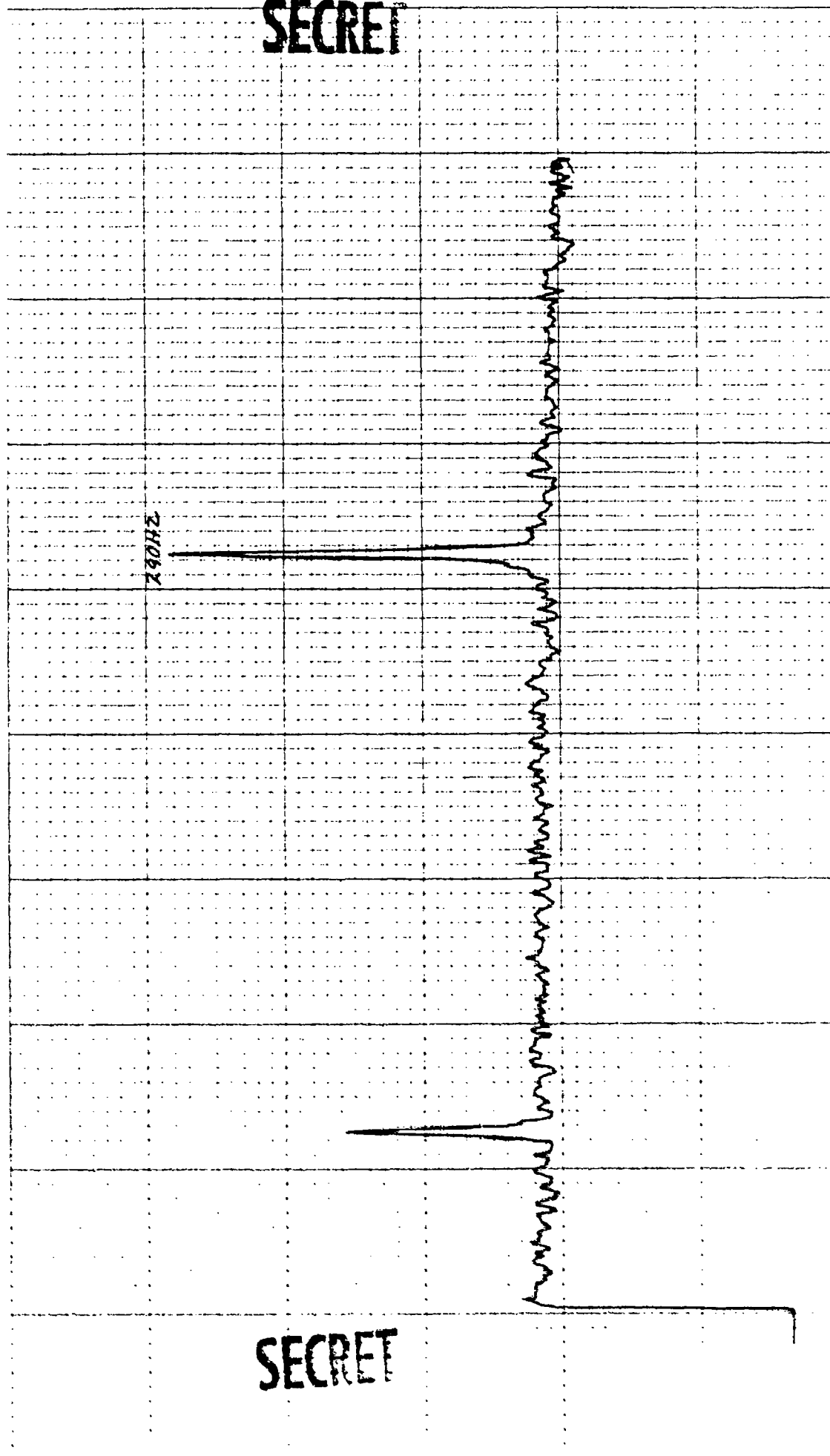
ATTN: - DB
WTC: HANNING



2000

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING

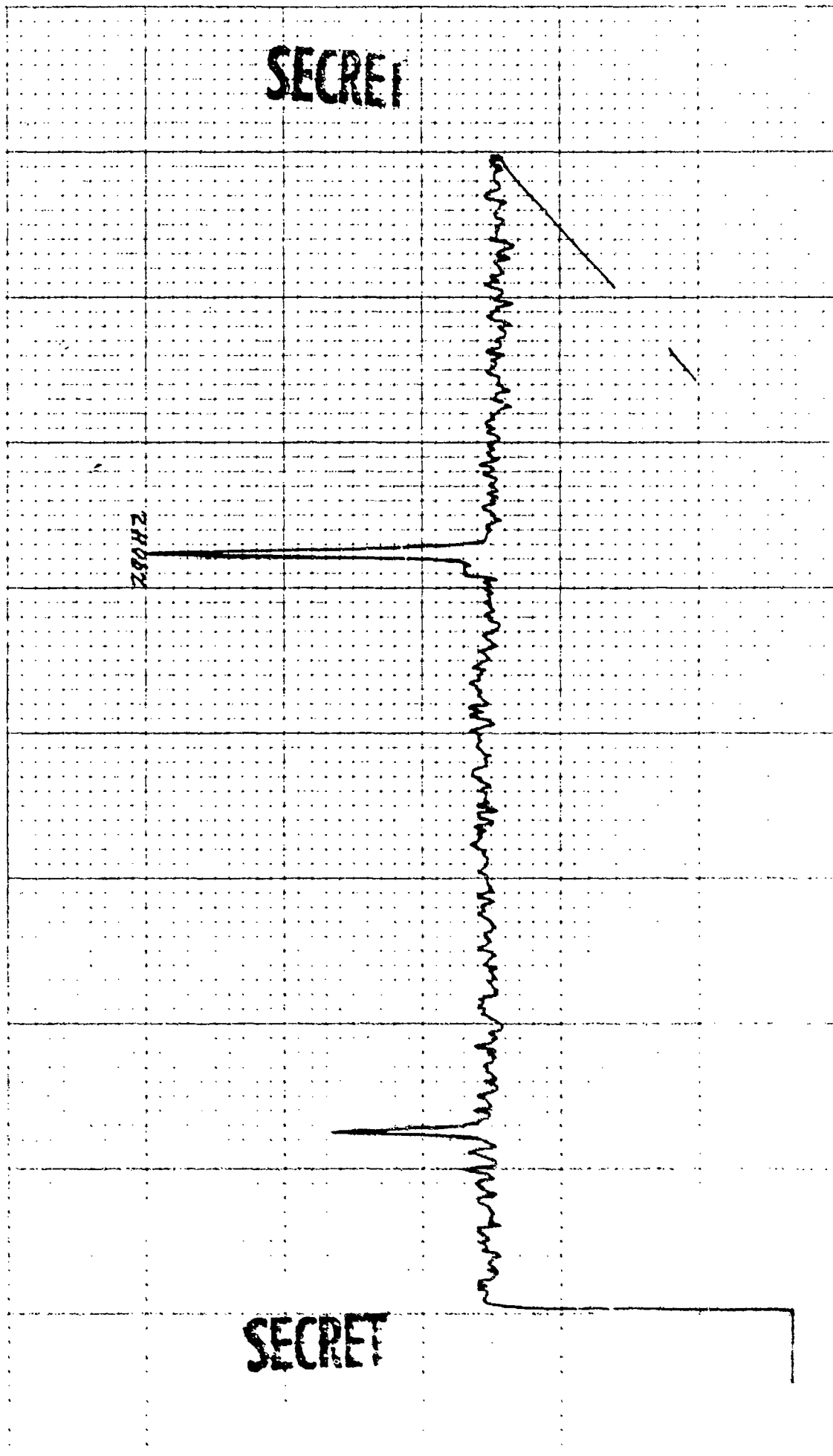


SECRET

SECRET

46 0703

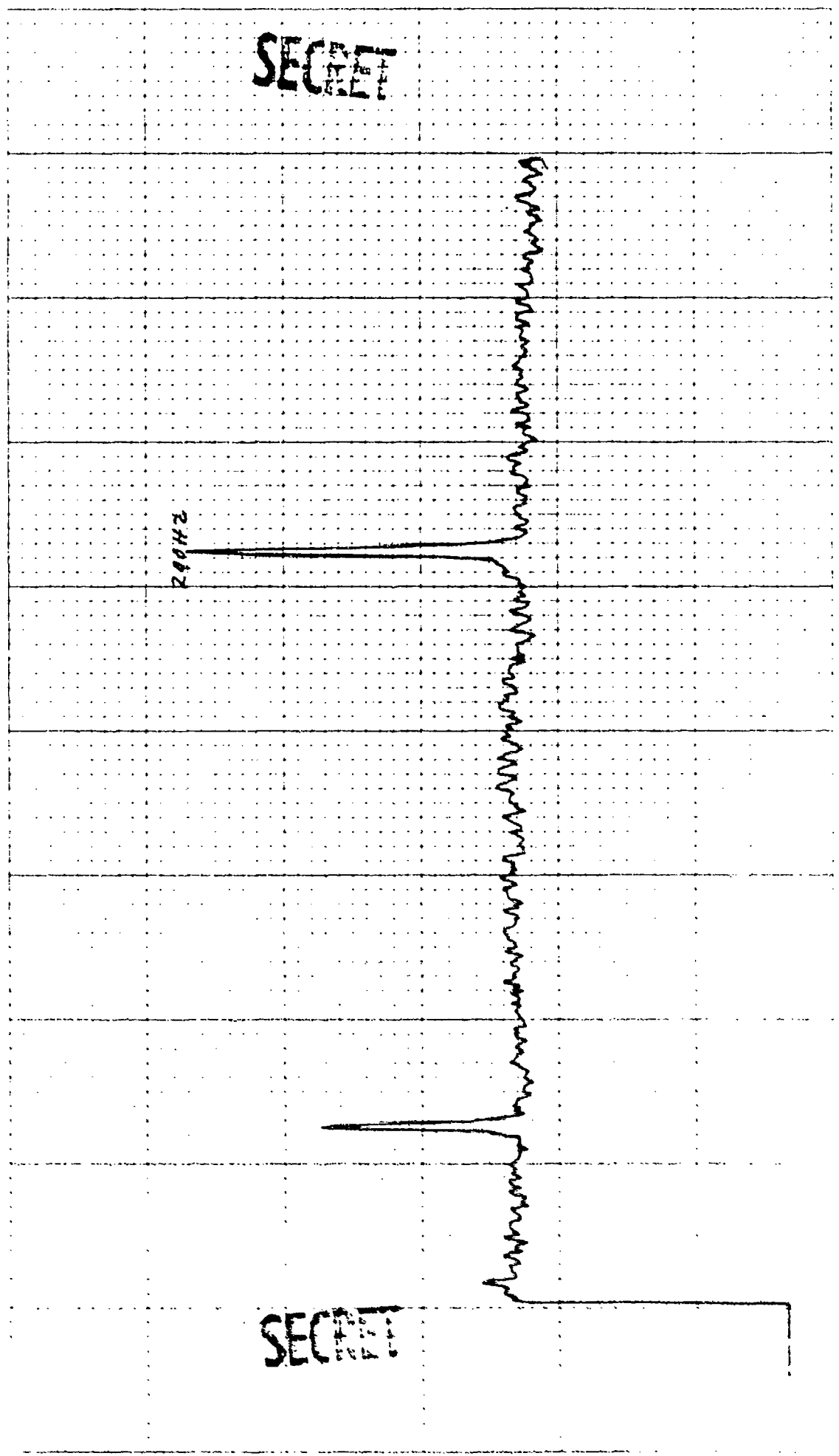
CONTROL: 2-8 -0202 (20) REEL: F29 INDEX: 1195
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS:
DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC HANNING
— DEG AZ STEERING



46 0703

18-2 2 100 100 100 100

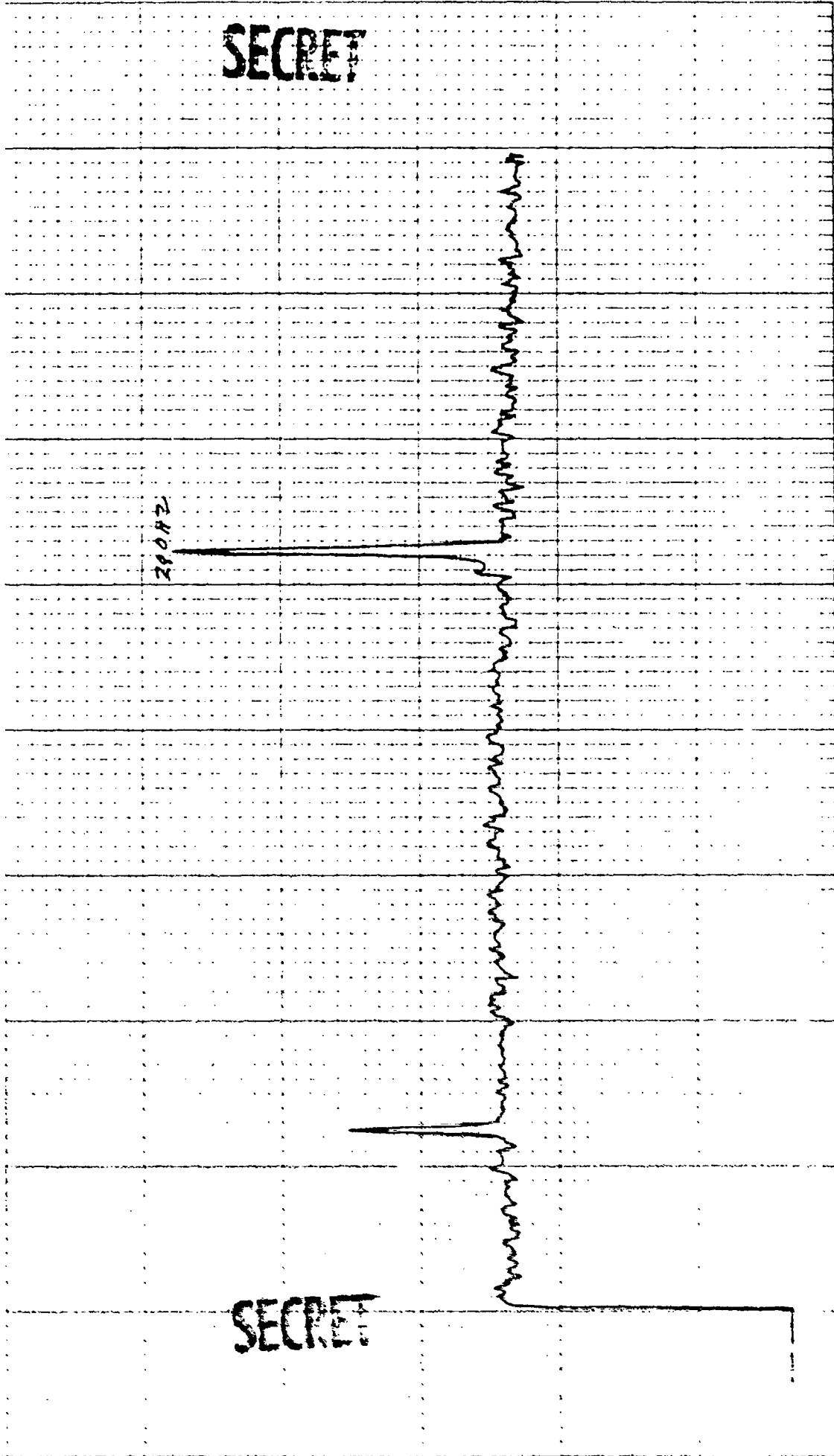
CONTROL: 2-0 -0202 (2/) DATE OF ANALYSIS: REEL: F29 INDEX: 1145
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING



46 0703

1/02 10:00 AM TO THE DBS 10:00 AM

CONTROL: 2-8 -0202 (22.) REEL: F29 INDEX: 1145
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING
1 ELEMENT
DEG AZ STEERING



CONTROL: 2-8 -0202 (23)
 OMNI SPECTRUM/ELEMENT 47)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 2800 HZ
 1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 — DEG AZ STEERING

PEEL: F29

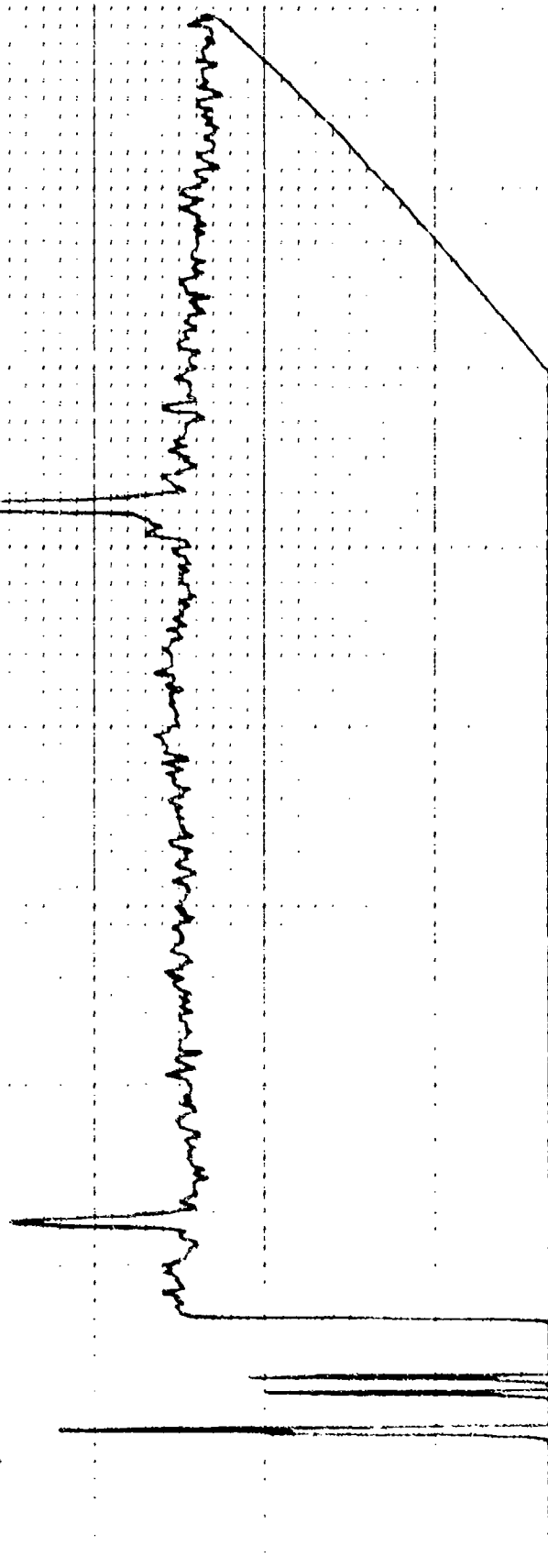
INDEX: 1145

INTERGRATION TIME 320 SECS
 FILTER WTG: HANNING

2800HZ

SECRET

SECRET



46 0703

CONTROL: 2-0 -0202 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-0-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX: 1145

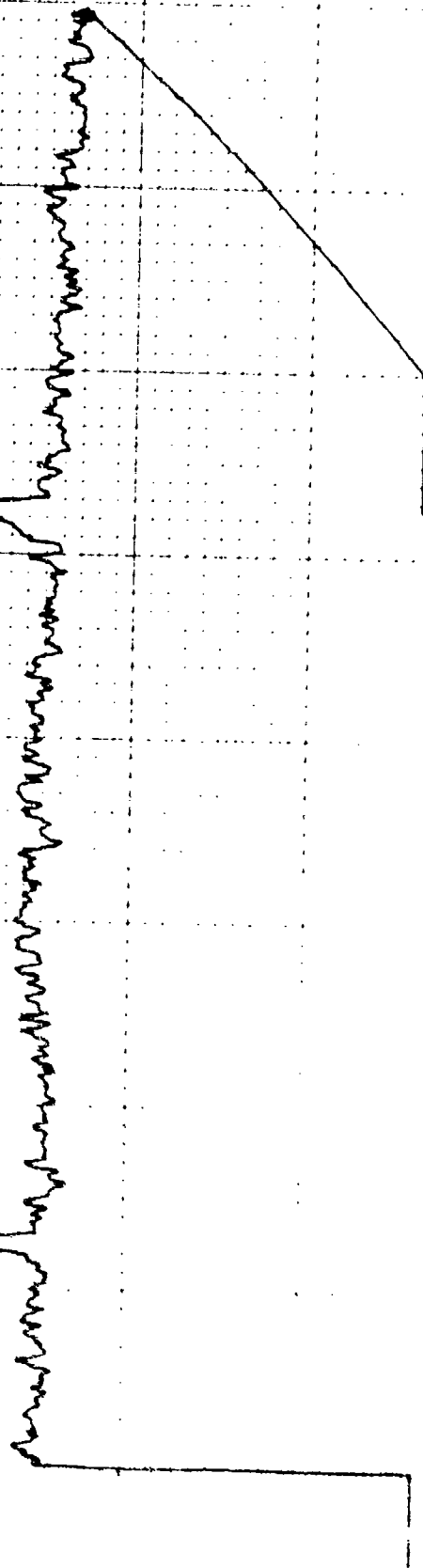
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTEN: — DB

290 HZ

SECRET

SECRET



45 0703

CONTROL: 2-8 -0202 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX 1/45

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING

200 HZ

SECRET

SECRET

46 0703

CONTROL: 2-8 - 0202 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING, STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

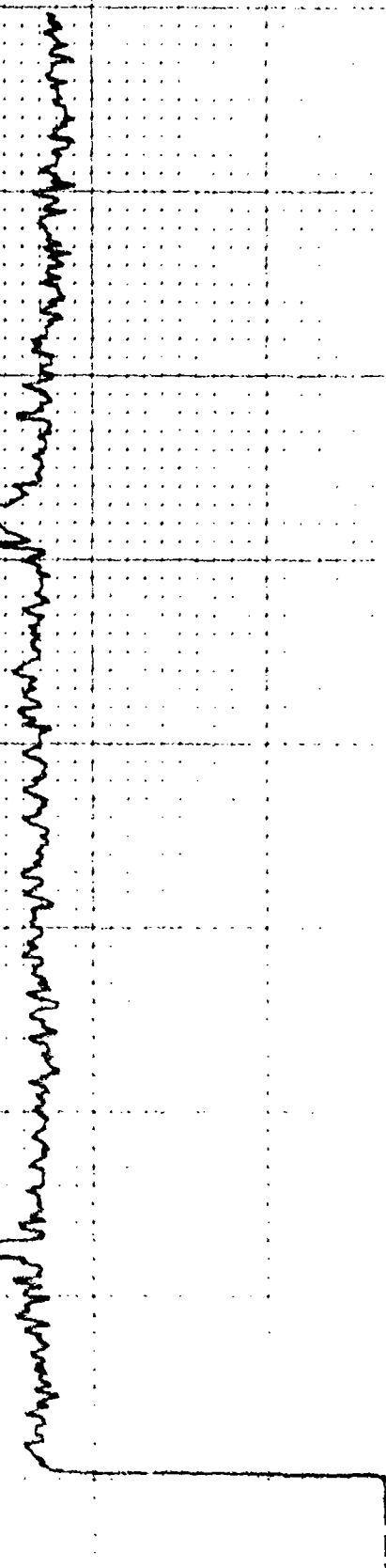
INDEX: 1/45

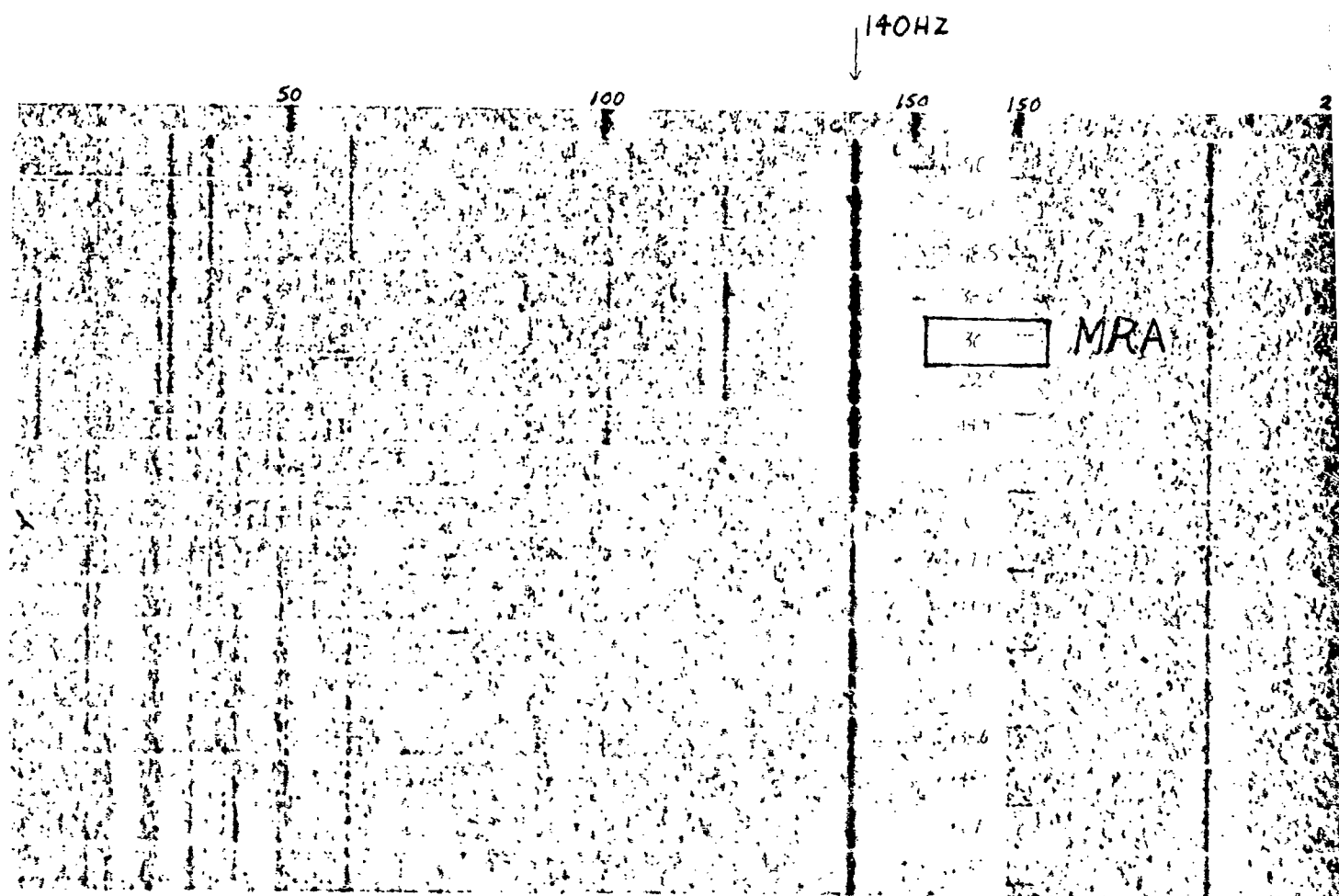
INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTC: HANNING

290 HZ

SECRET

SECRET





CONTROL NUMBER _____
 NUMBER OF ELEMENTS _____
 FREQUENCY BAND _____ TO _____ HZ
 RANGE _____ A.M.

HISTOGRAM
 TAPE REEL NUMBER _____
 ANALYSIS BAND WIDTH _____ HZ
 WATER DEPTH _____ FMS

CEEME
 DATE
 EXERC

140HZ

SECRET

290HZ

295HZ

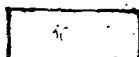
150

150

200

250

300



MRA

HISTORICAL

TAPE REEL NUMBER

TAPE COUNT

SECRET

ELEMENT NUMBERS

DATE

EXERCISE: BEARING STAKE

SAN-XXX-78-0135

ANALYSIS BAND WIDTH

WATER DEPTH

EMER
TE
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CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-22.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-12.8</u>	
BEAMFORMER GAIN	<u>+24</u>	+11.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+11.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-55.4</u>	
BEAMFORMER GAIN	<u>+24</u>	-31.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+11.2</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	<u>42.6</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>38.6</u>	
MRA CORRECTION	<u>+ .2</u>	38.8	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	30.6	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 296 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-26.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-16.6	
BEAMFORMER GAIN	<u>+24</u>	+7.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+8.2	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-71.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.8	
BEAMFORMER GAIN	<u>+24</u>	-37.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+8.2</u>	
SIGNAL LEVEL FOR SNR	<u>-37.8</u>	45	
PROCESSOR CORRECTION	<u>-4.0</u>	41	
MRA CORRECTION	<u>+ .8</u>	41.8	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	33.6	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-62.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-52.4	
BEAMFORMER GAIN	<u>+24</u>	-28.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-27.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-71.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.8	
BEAMFORMER GAIN	<u>+24</u>	-37.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-27.6</u>	
SIGNAL LEVEL FOR SNR	<u>-37.8</u>	10.2	
PROCESSOR CORRECTION	<u>-5.6</u>	4.6	
MRA CORRECTION	<u>+ .8</u>	5.4	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	-2.8	SNR 1 HZ BAND

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DATA POINT 7

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+11.2</u>	<u>+ 8.2</u>	<u>- 27.6</u>
ARRAY SIGNAL GAIN	<u>27.4</u>	<u>25.7</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements	<u> </u>	<u> </u>	<u> </u>
DIFFERENCE	<u>+ 3.4</u>	<u>+1.7</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>38.0</u>	<u>41.8</u>	<u>5.4</u>
MEAN OMNI SNR	<u>24.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>9.4</u>	<u>6.4</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.0</u>	<u>12.0</u>	<u>11.7</u>
DIFFERENCE	<u>- .6</u>	<u>- 5.6</u>	<u> </u>

CONFIDENTIAL

46 0703

CONTROL: 0202 - 16 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 12 DEG. AZ STEERING

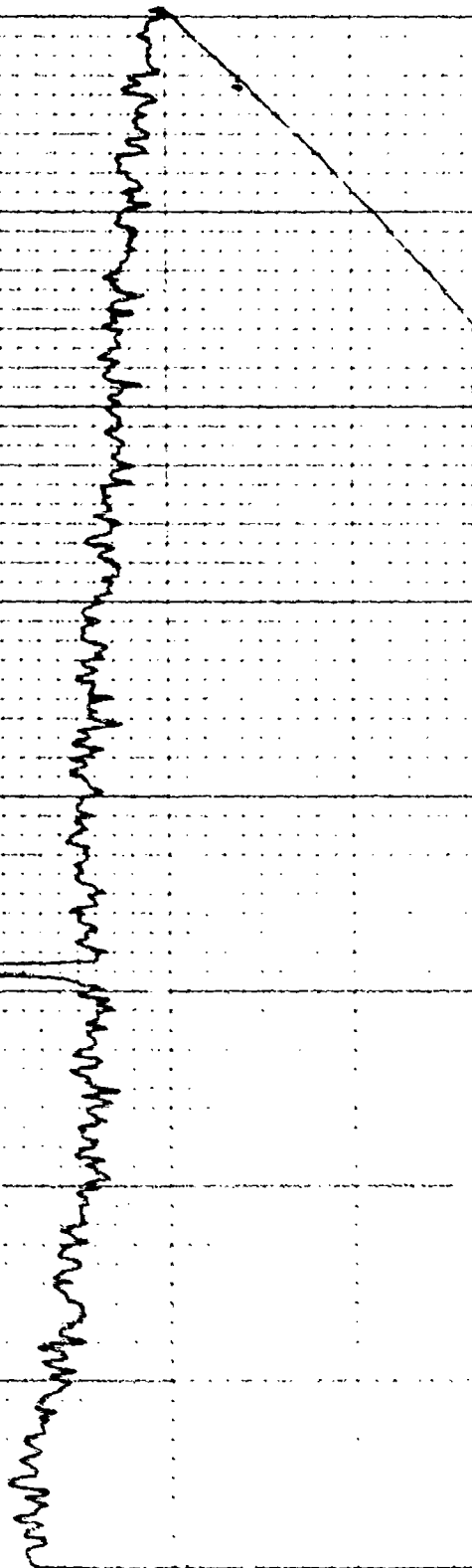
REEL: F29
INTEGRATION TIME 320 SECS
FILTFR
ATTEN: -24 DB
WTG: HANNING

INDE X1145

150 HZ

SECRET

SECRET



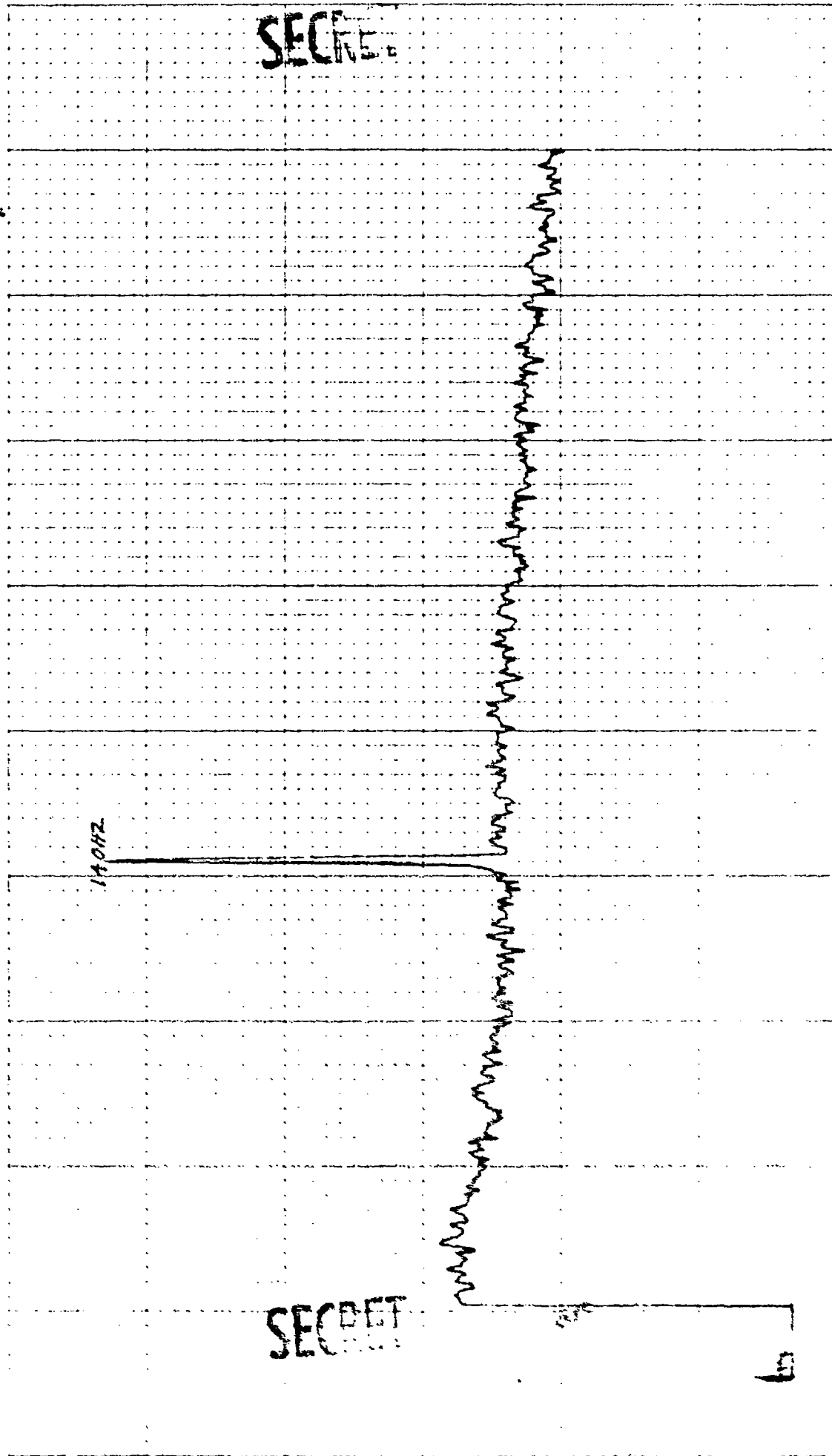
46 0703

CONTROL: 0202 - 16 (DP7) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-16
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ
16 ELEMENTS -14 DEG. AZ STEERING

REEL: F29

INDE X145

INTEGRATION TIME 320 SECS
ATTN: -24 DB
FILTER WTC: HANNING



46 0703

CONTROL: 0202 - 16 (007)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-1/4 DEG. AZ STEERING

REEL: F29
INDE X/145
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET

46 0703

CONTROL: 0202-16 (007)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEAPING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-27-0202 Z
ANALYSIS BANDWIDTH: 1710 HZ
-10 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -2V DB
FILTER WTC: HANNING

150 HZ

SECRET

SECRET

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46 5703

CONTROL: 0202 - 16 (DP7),
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEAPING STAGE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - - -
-16
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-19.5 DEC. AZ STEERING

REEL: F09
INDE X/195

INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FITTED WTG: HANNING

140 HZ

SECRET

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Handwritten notes:
read through spectrum and find power level with reference

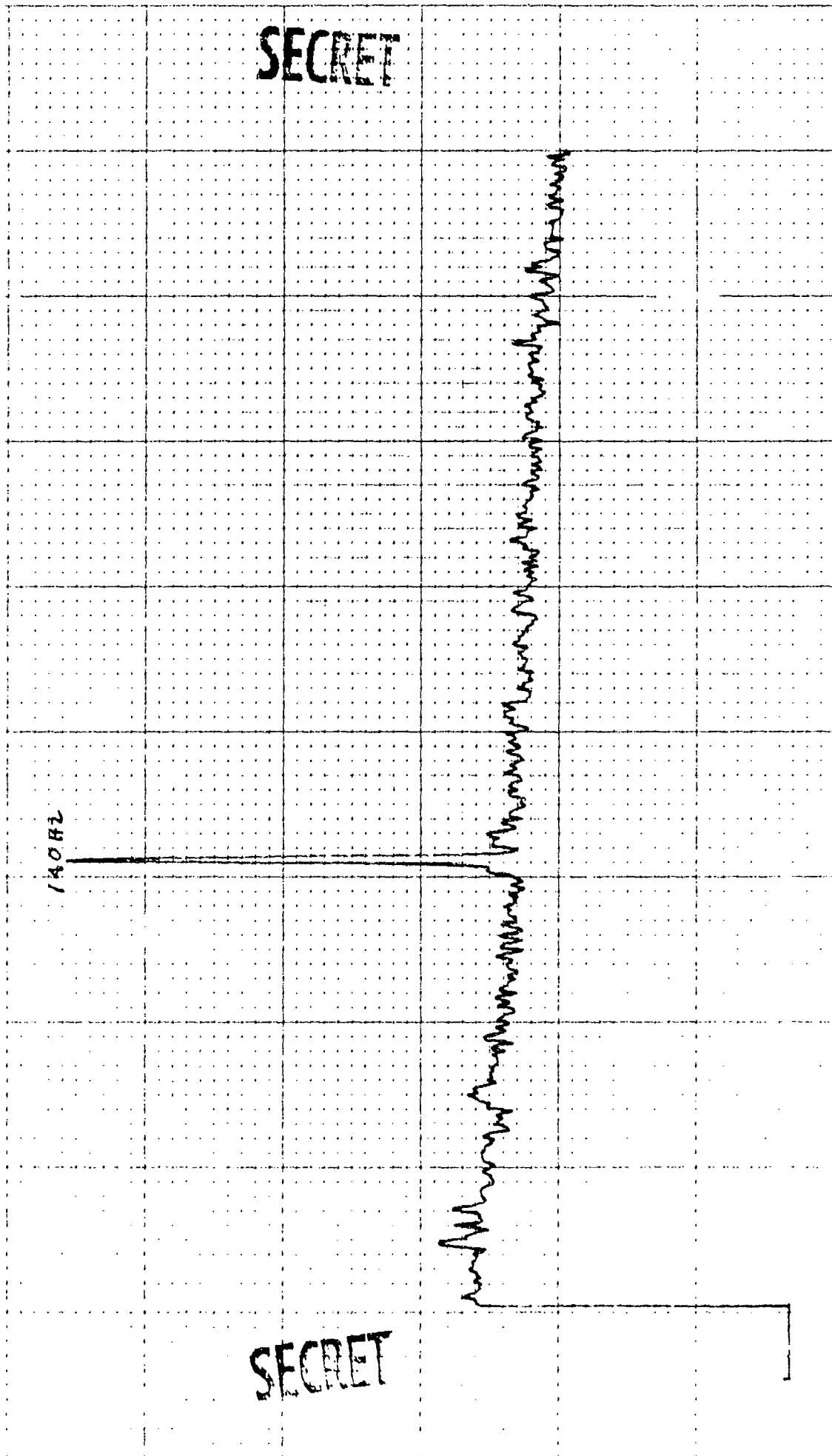
45 0703

CONTROL: 0202 - 16 (007)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-22 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
WTG: HANNING

INDE X 1/45



46 0703

DATE OF ANALYSIS: 1-16

CONTROL: 0202-16 (3P7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-24 DEG. AZ STEERING

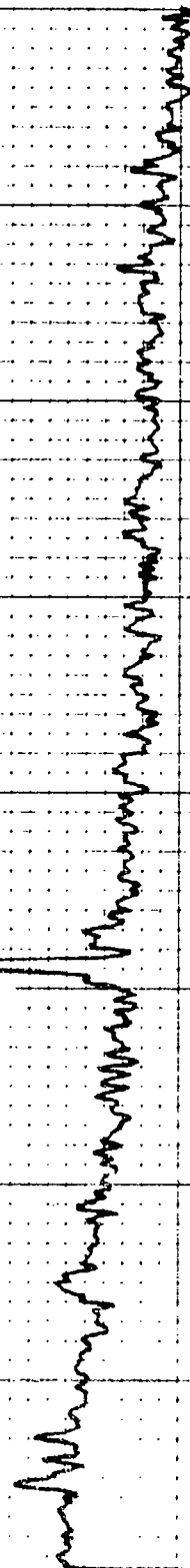
REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -2YDB
WTG: HANNING

INDEX 1/45

SECRET

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14577Z



46 0703

CONTROL: 0202-16 (D97) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FIITFP WTG: HANNING
16 ELEMENTS -26 DEG. AZ STEERING

SECRET

SECRET

140 HZ

Handwritten notes and scribbles across the grid.

Table 1

SECRET

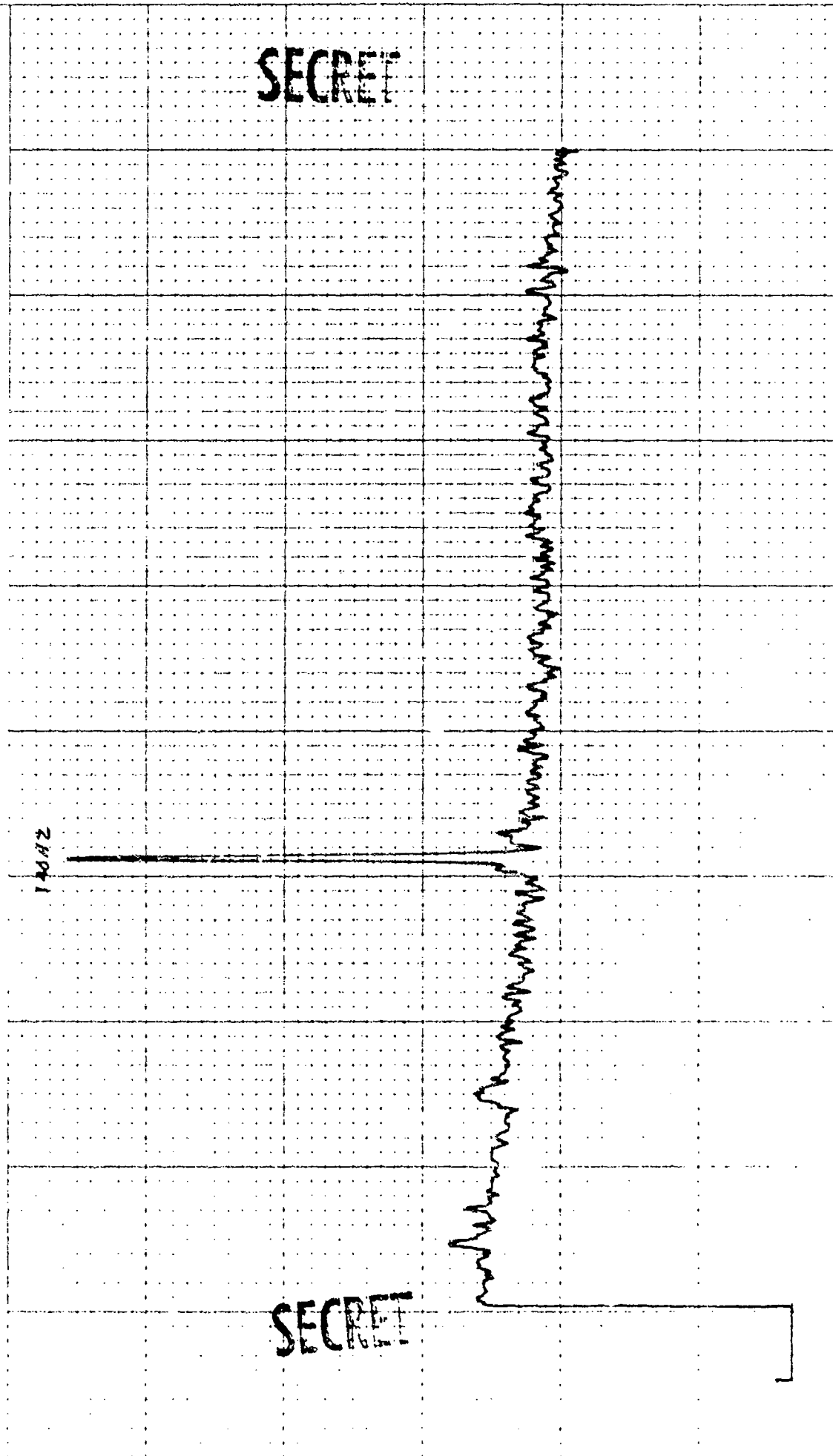
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und dann in der Mitte
einen kleinen Kreis

CONTROL: 0222 - 5/ (DPT)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

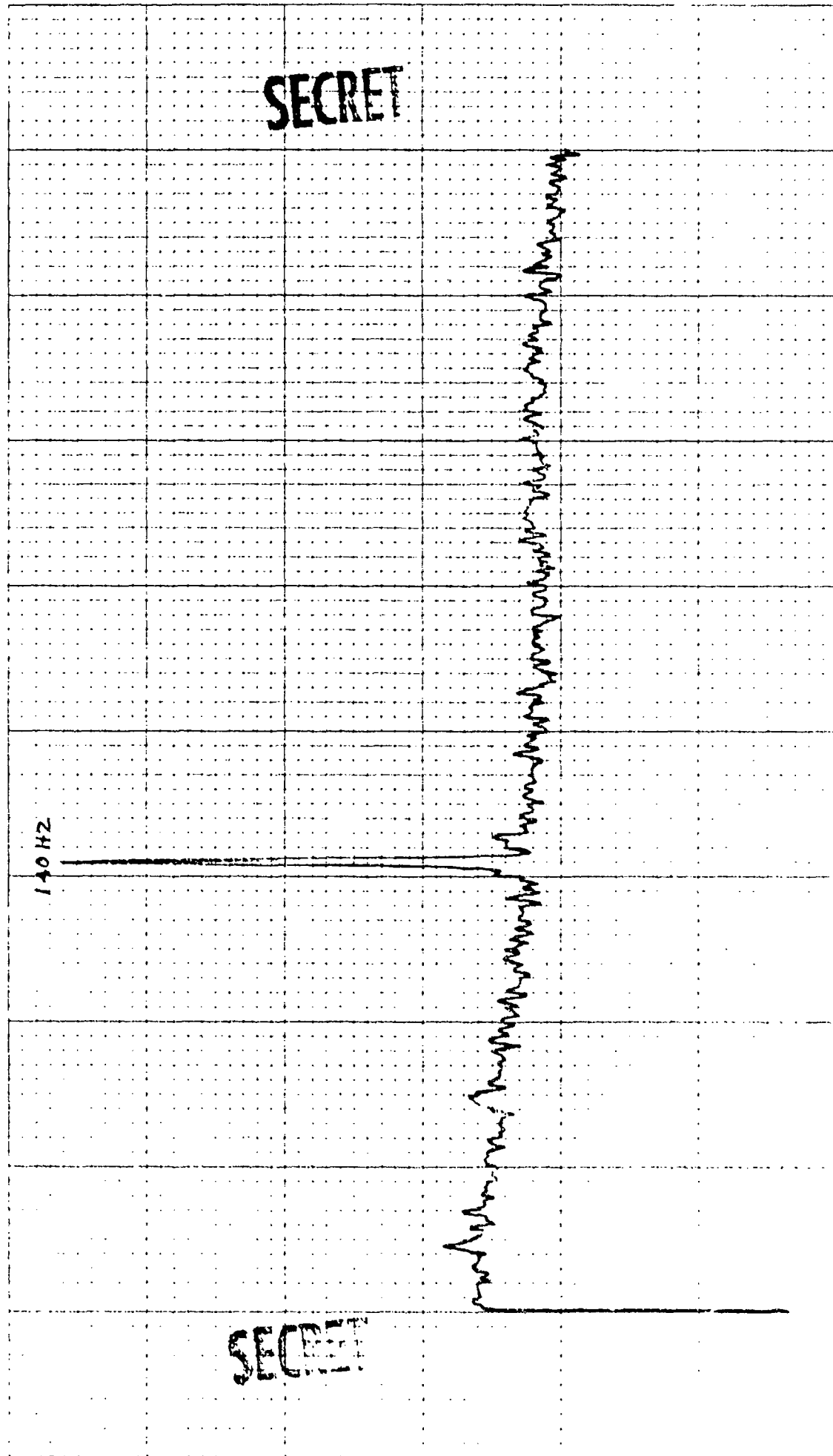
DATE OF ANALYSIS: _____
 , -/6
 DATE/TIME: 2-8-77 - 0222Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -28 DEG. AZ STEERING

REEL: F29
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING
 INDE X1/45



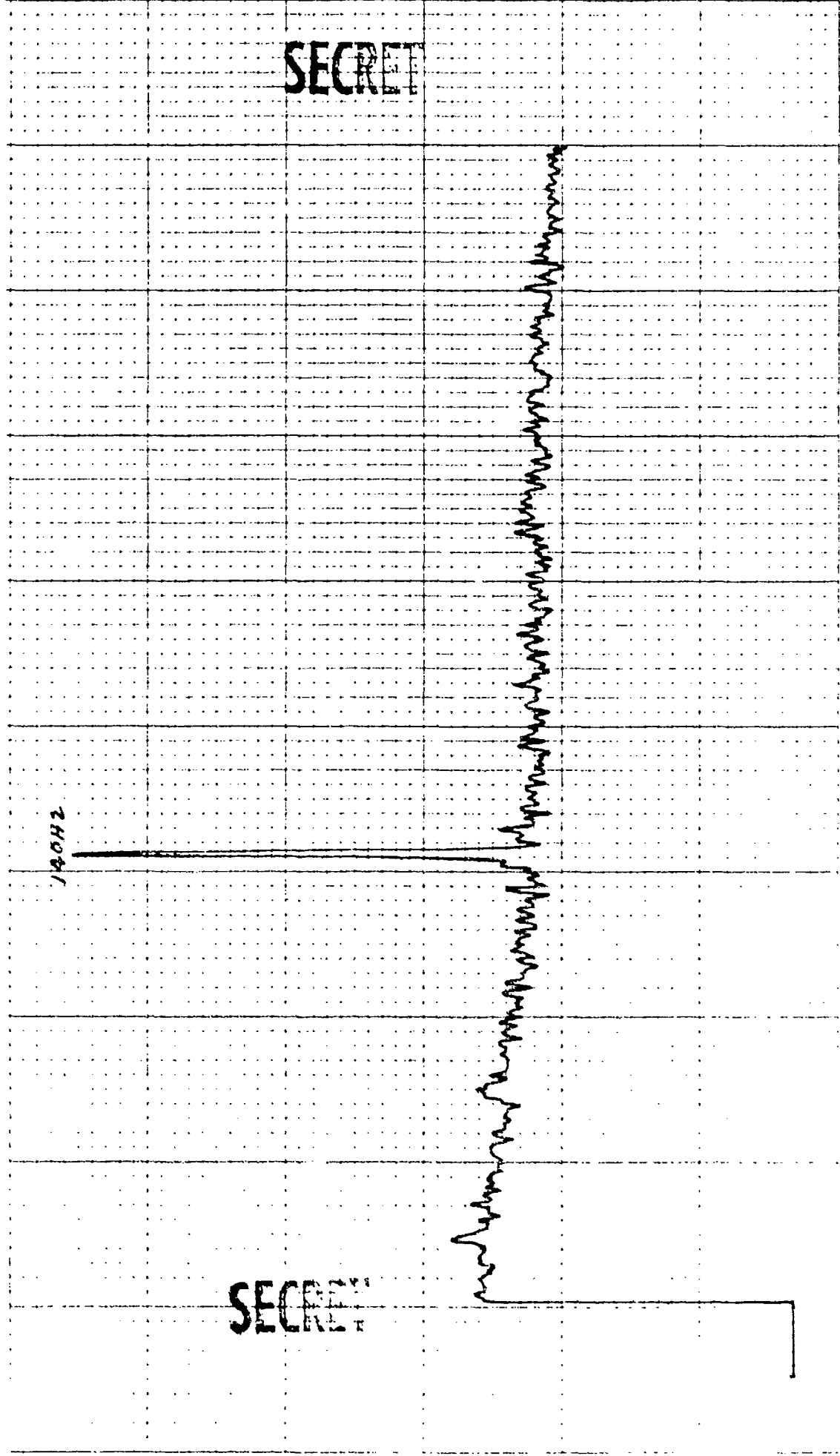
46 0703

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16-77
BEAMFORMED SPECTRUM(ELEMENTS) REEL: F29 INDE X/145
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 150 HZ FILTER WTC: HANNING
16 ELEMENTS -29 DEG. AZ STEERING



46 0703

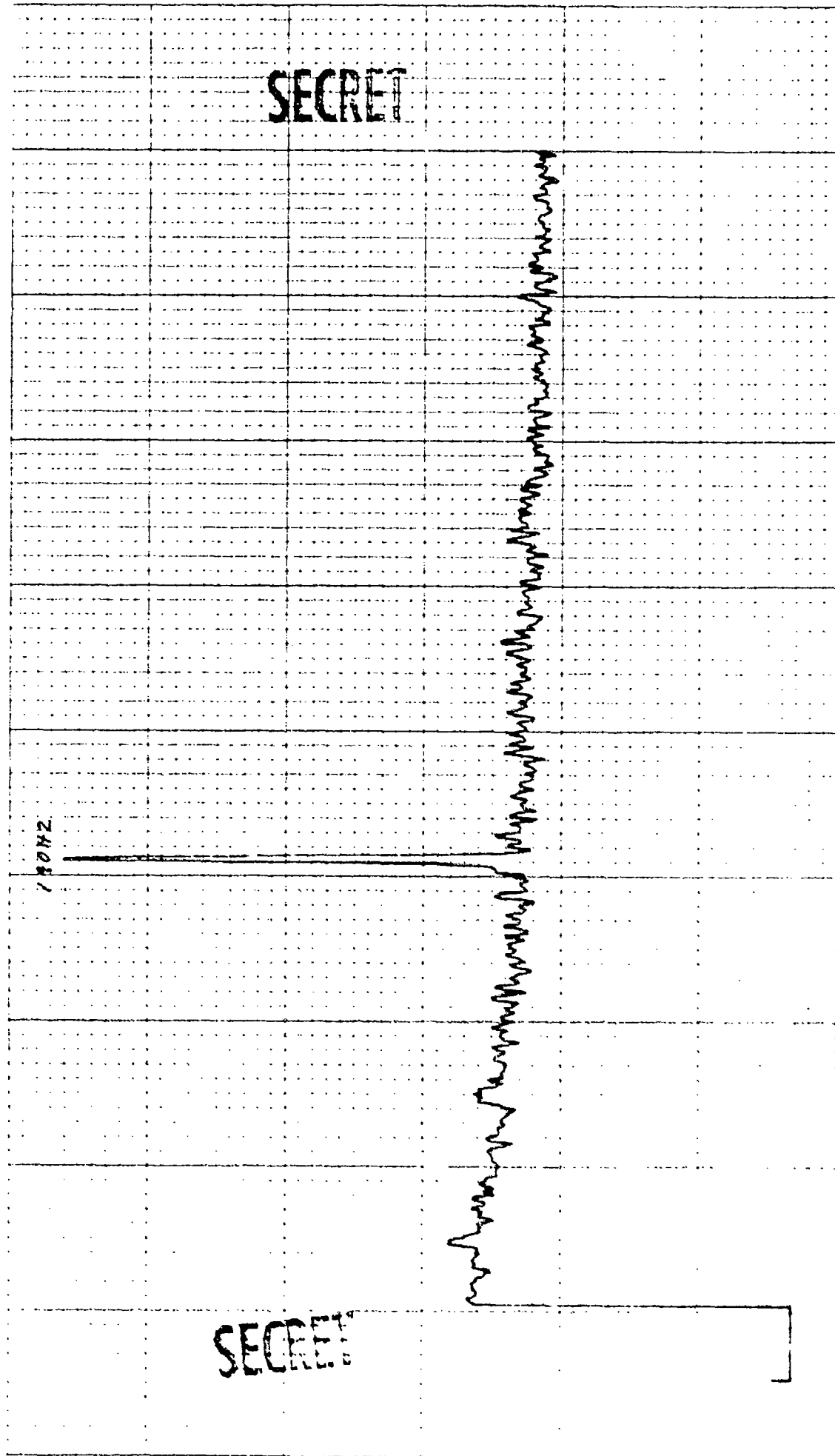
CONTROL: 0202- 16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTC: HANNING
16 ELEMENTS -30 DEG. AZ STEERING



Page 3 of 3

46 0703

CONTROL: 0202-16 (DP7) REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE FILTER WTC: HANNING
CENTER FREQ: 150 HZ
16 ELEMENTS
DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-32 DEG. AZ STEERING



SECRET

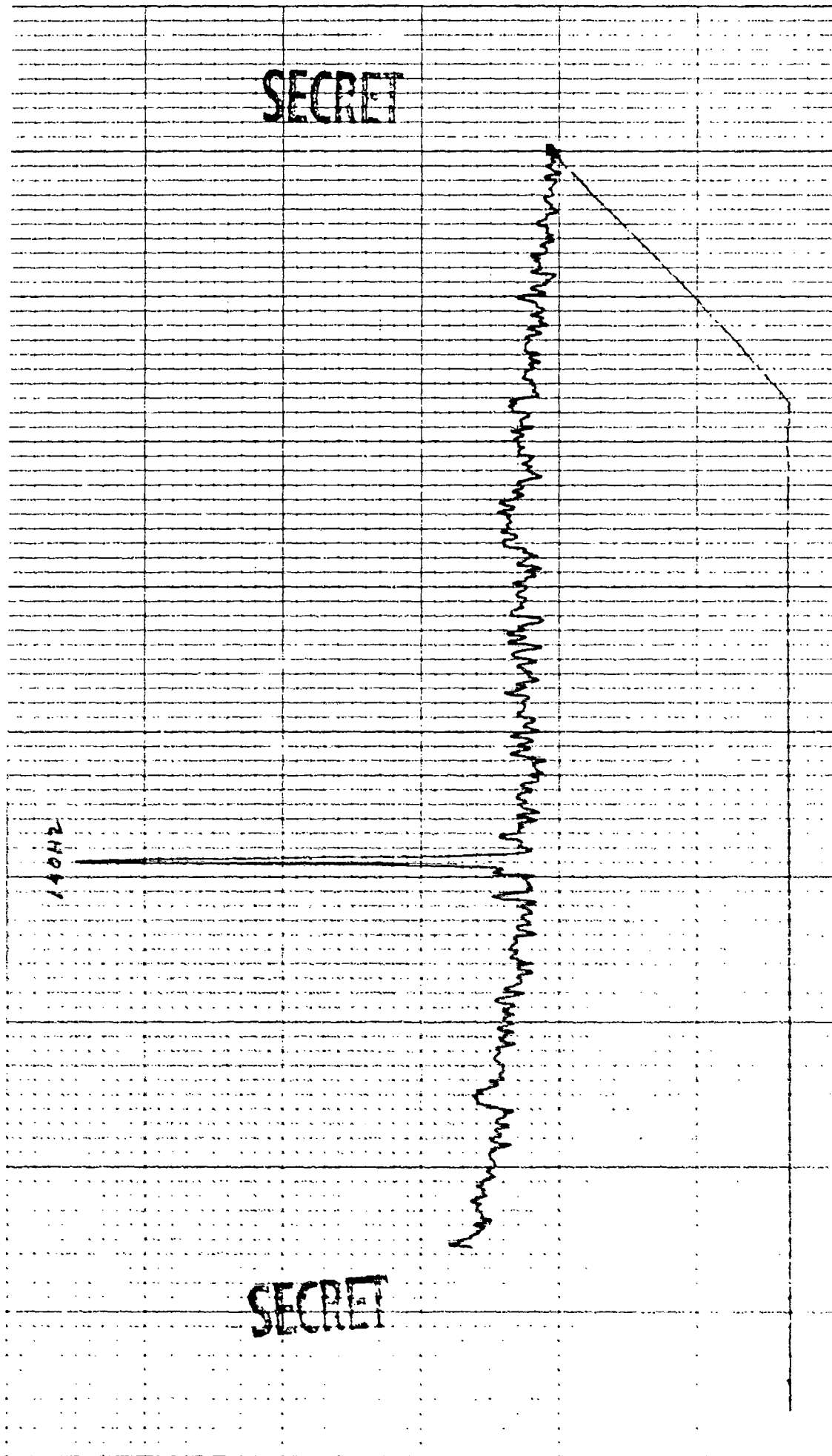
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46 0703

CONTROL: 0202 - 16 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-74 DEG. AZ STEERING

REEL: F29
INDE X 1145
INTEGRATION TIME 320 SECS
ATTEN: -24DB
FILTER WTG: HANNING



SECRET

1-2 2-10 2-10 2-10

46 0703

CONTROL: 0202-16 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

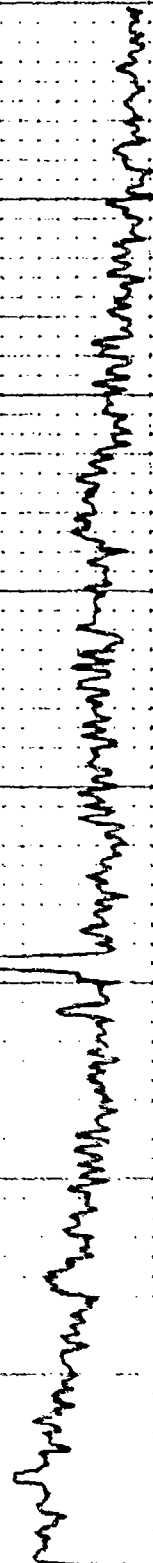
DATE OF ANALYSIS: - - -
1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-36 DEG. AZ STEERING

REEL: F28 INDE X1145
INTEGRATION TIME 320 SECS
ATTN: -24 DB
FILTER WTG: HANNING

SECRET

SECRET

140 HZ



1-17 24.00 25.00 26.00 27.00

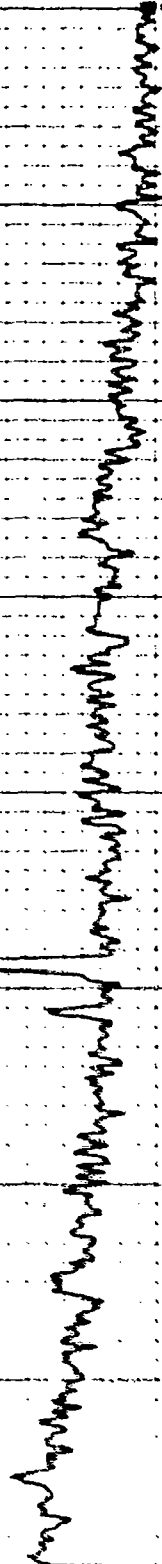
46 0703

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F29 INDEX: X1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ - 30 DEG. AZ STEERING

140 HZ

SECRET

SECRET



46 0703

CONTROL: 0202-16 (207)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0102Z
ANALYSIS BANDWIDTH: 1/10HZ
- 12 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILTFR
ATTN: 24 DB
WTG: HANNING

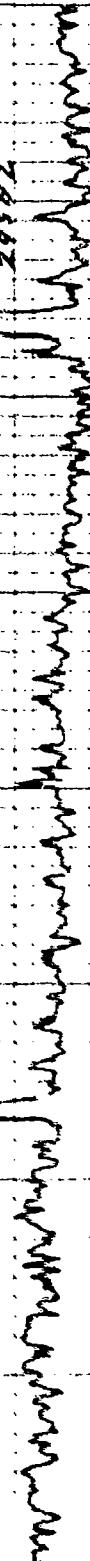
INDE X/145

SECRET

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200#2

205#2



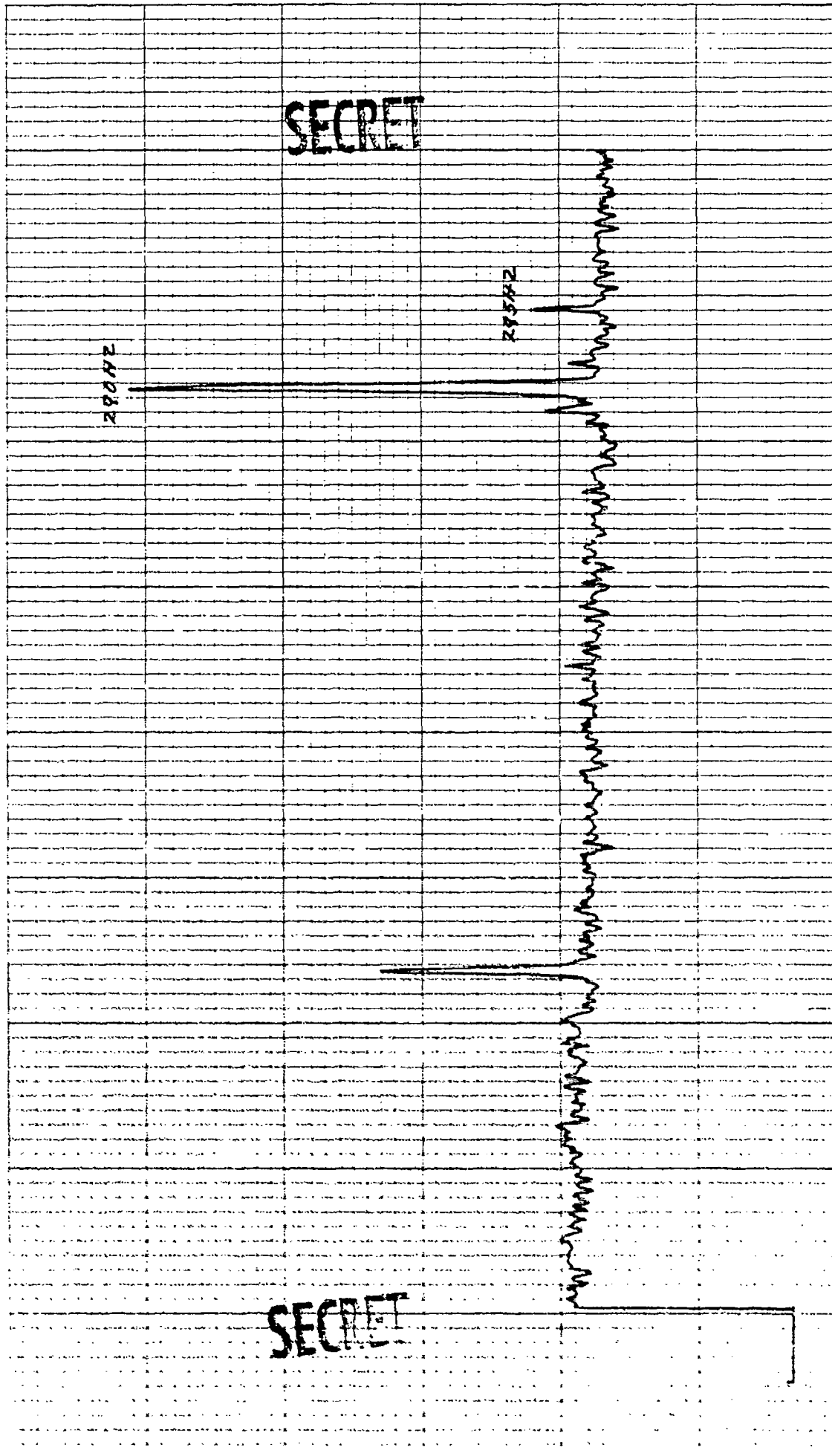
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46 0703

CONTROL: Q202-16 (DPT)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - Q202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-14 DEG. AZ STEERING

REEL: F29 INDE X1/45
INTEGRATION TIME 320 SECS
ATTN: -24 DB
FILTER WTG: HANNING



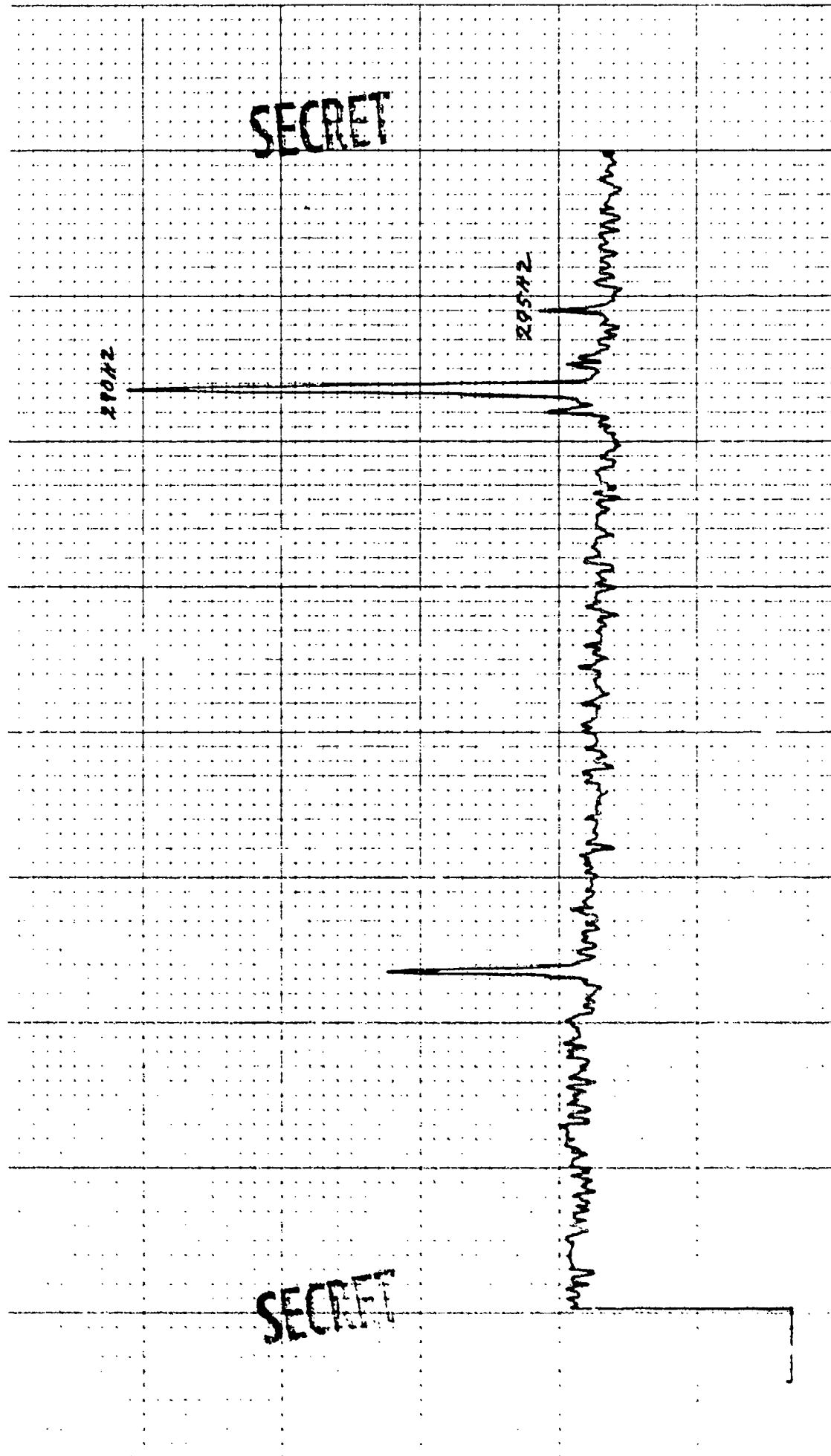
46 0703

CONTROL: 0202 - 16 (DPT)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-16 DEG. AZ STEERING

REEL: F39
INTEGRATION TIME 320 SECS
ATTN: -2V DB
FILTFR WTC: HANNING

INDE X 1145



46 07 29

CONTROL: 0202-16 (002)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0200Z
ANALYSIS BANDWIDTH: 11/10HZ
-10.5 DEG. AZ STEERING

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
ATTN: -24 DB
FILTFR WTC: HANNING

290 HZ

295 HZ

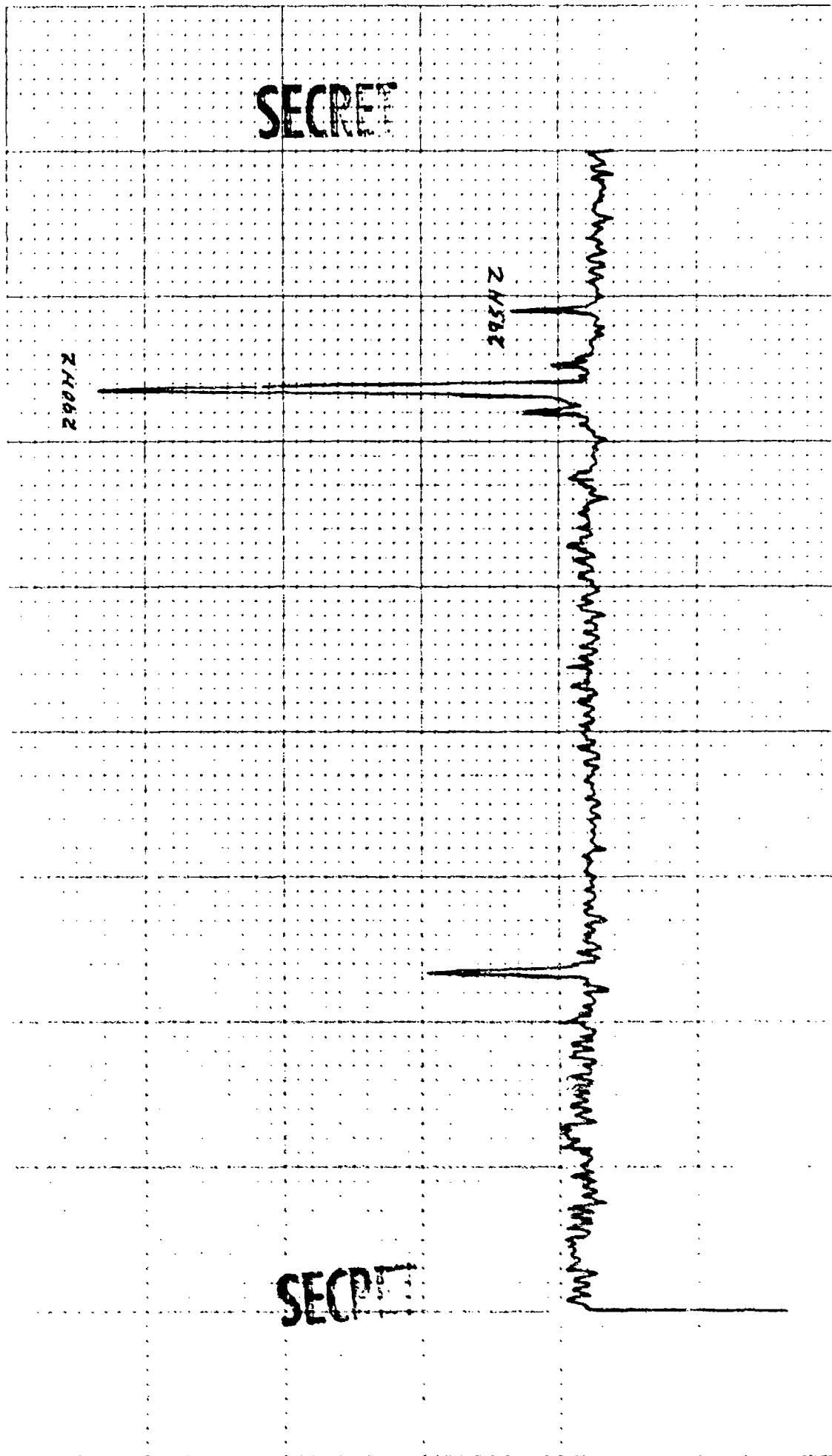
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46 0703

CONTROL: 0202 - 5/ (007) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X 1105
 BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 24 DB
 EXERCISE: BEARING STAKE FILTER WTC: HANNING
 CENTER FREQ: 270 HZ
 16 ELEMENTS

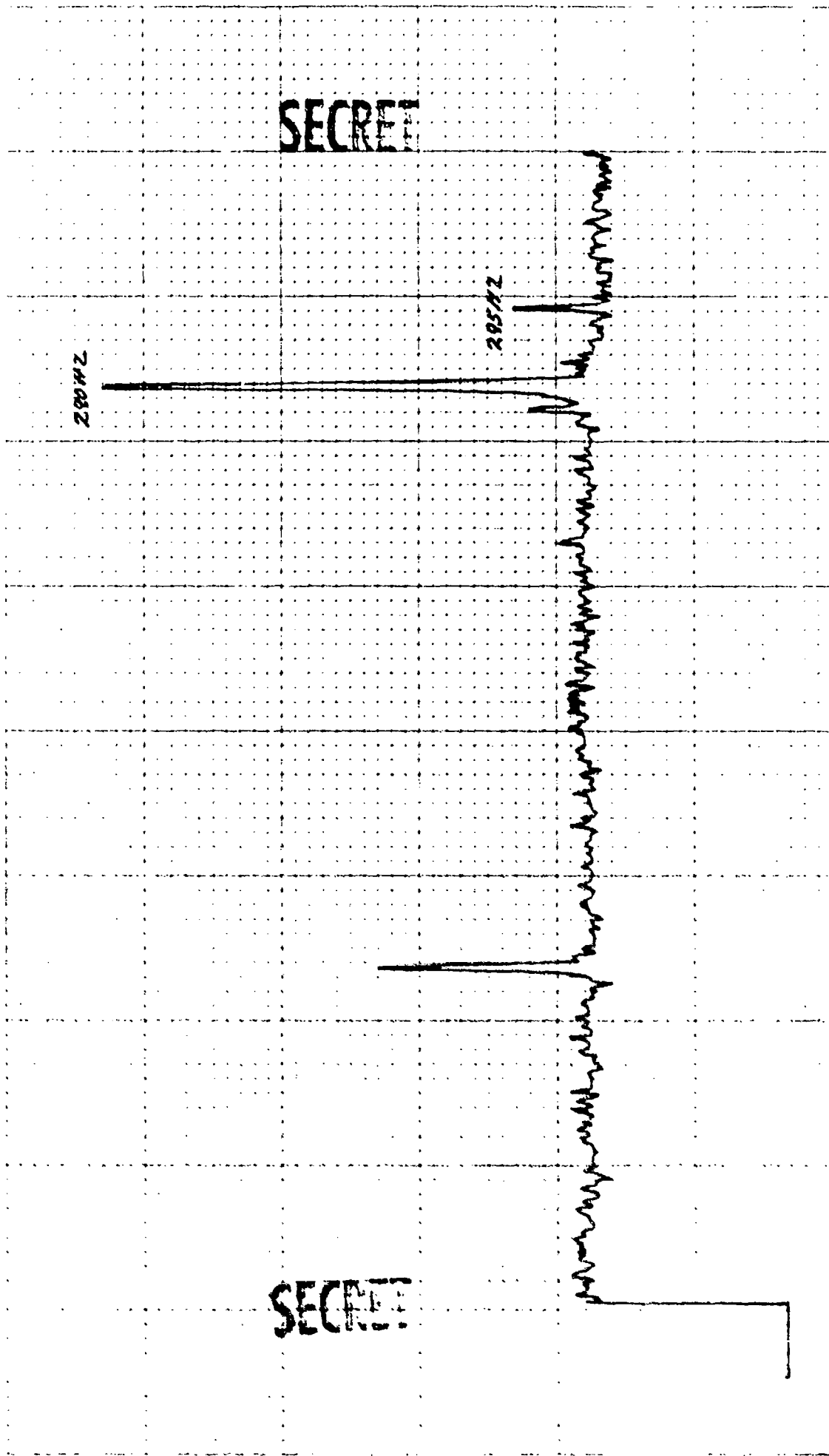


45 0793

CONTROL: 0202-16 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 22 DEG. AZ STEERING

REEL: INDEX
INTEGRATION TIME 320 SECS
ATTEN: DB
FILTFR WTC: HANNING



46 0703

CONTROL: 0202-16 (207)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-24 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
WTG: HANNING

INDEX 1145

290 HZ

295 HZ

SECRET

SECRET

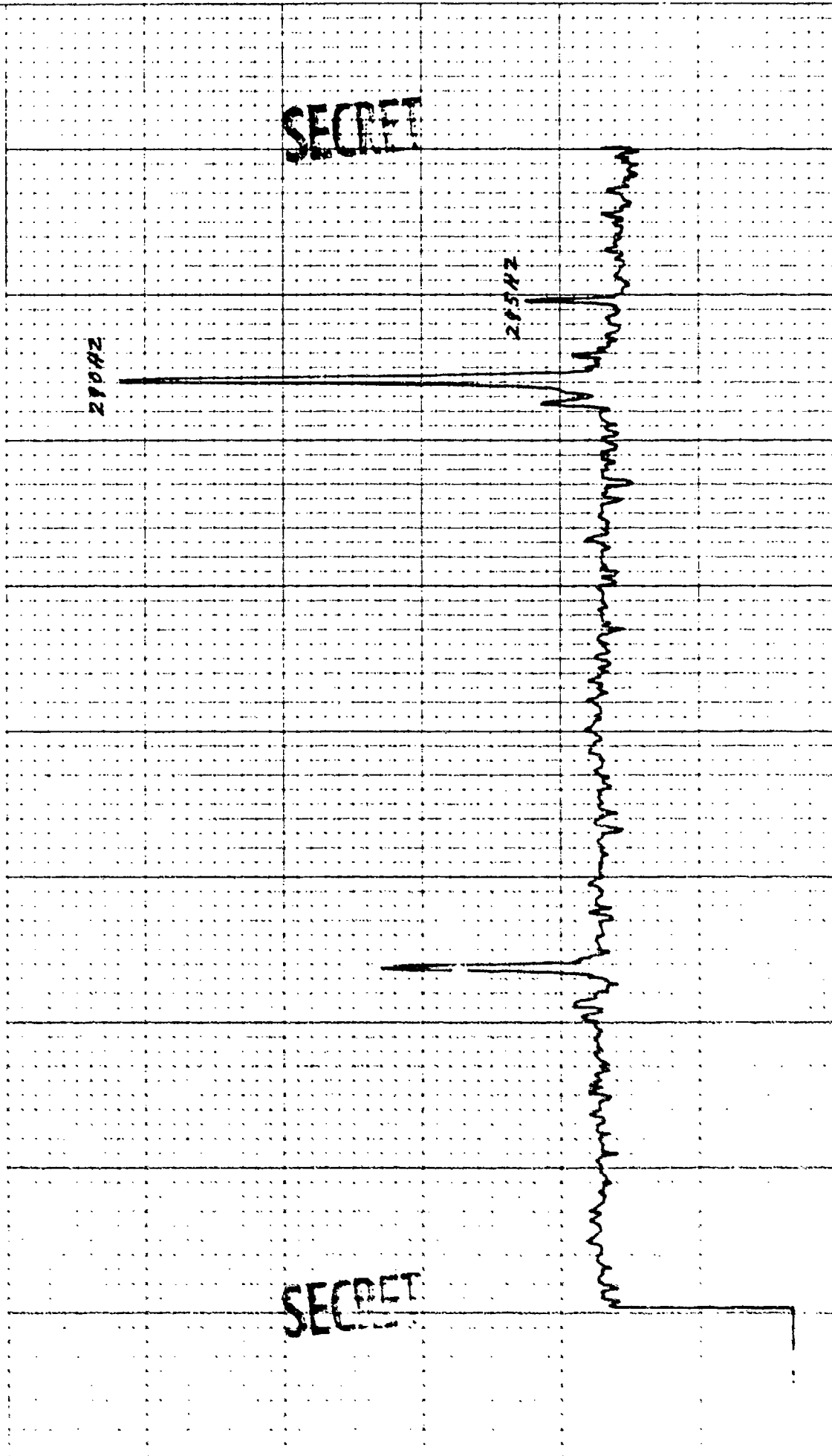
46 0703

CONTROL: 0102 - 16 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 26 DEC. AZ STEERING

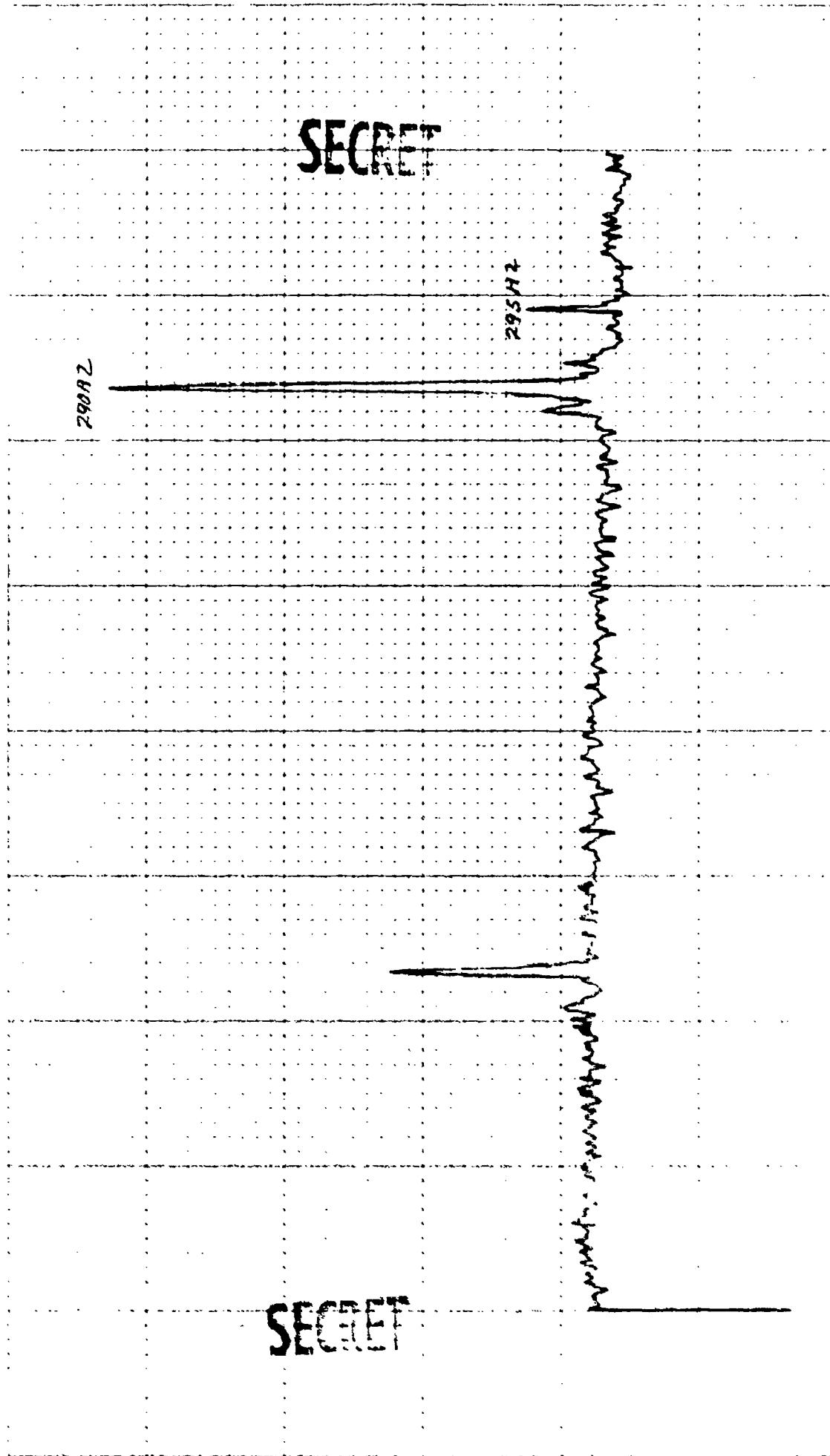
REEL: F29
INTEGRATION TIME 320 SECS
ATTN: -24 DB
WTG: HANNING

INDEX 1195



46 0703

CONTROL: 0202-16 (207) DATE: ANALYSIS: - - - - - REEL: F29 INDE X/45
BEAMFORMED SPECTRUM(ELEMENTS) -16
EXERCISE: BEARING STAKE DATE: TIME: 2-0-77 - 0202Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -2Y DB
16 ELEMENTS -27 DEG. AZ STEERING FILTER WTC: HANNING



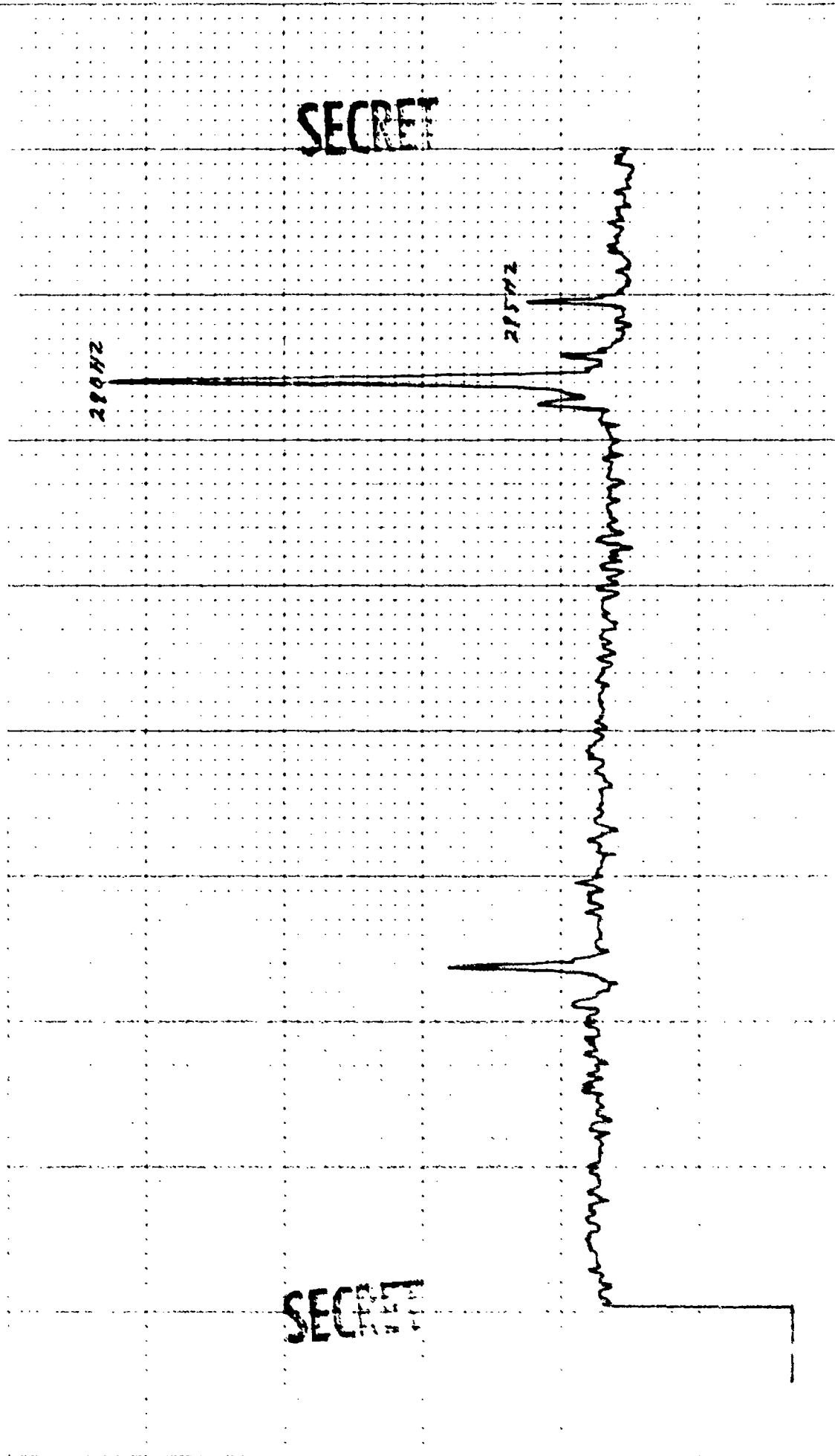
46 0703

CONTROL: 0202 - 16 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-20 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTC: HANNING

INDE X 1195



100 0703

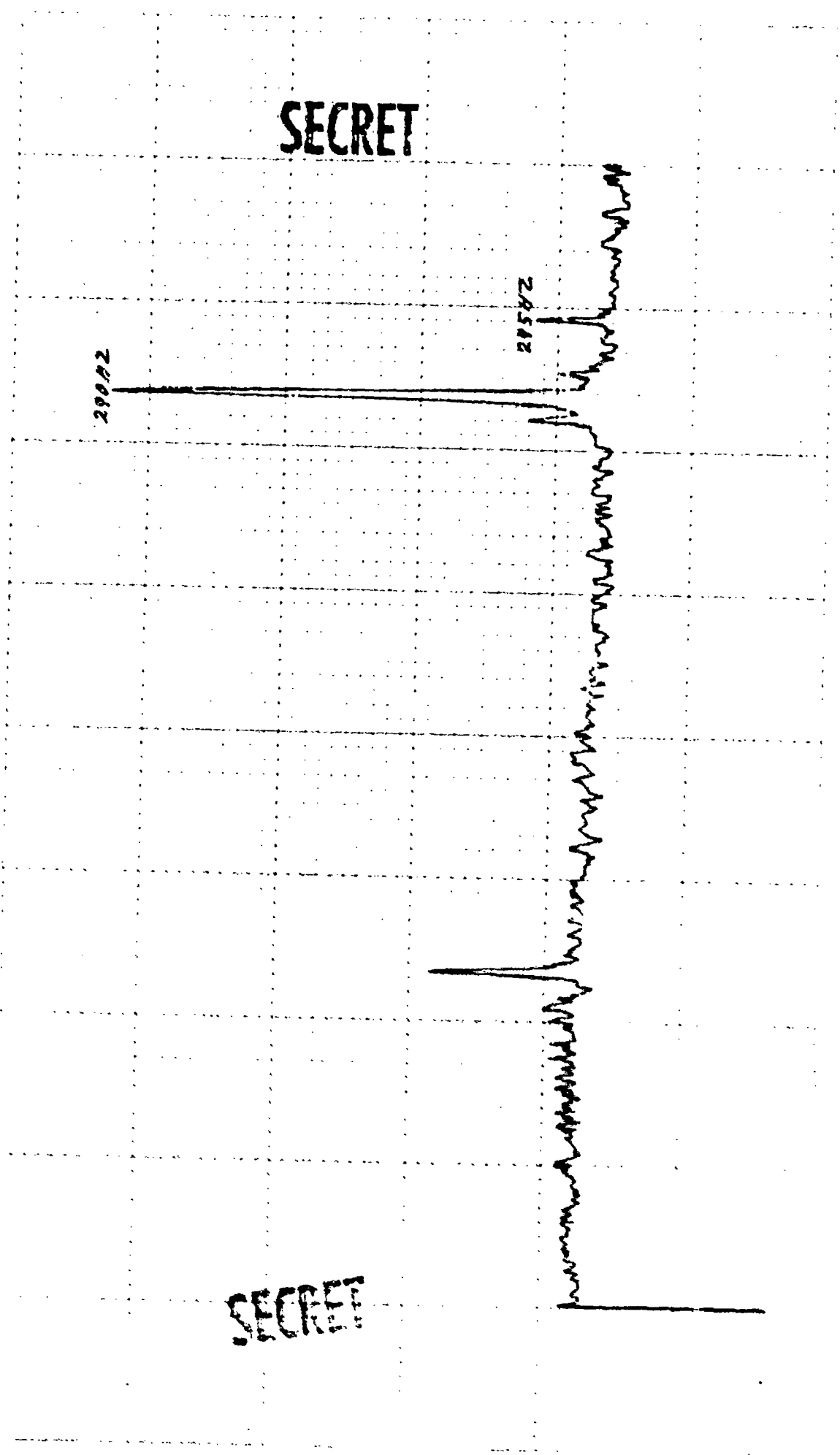
CONTROL: 0202 - 16 (002)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
/ - /
DATE/TIME: 2-8-77 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-29 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FITTED
INDEX: 1145
ATTEN: 24 DB
WTC: HANNING

SECRET

SECRET



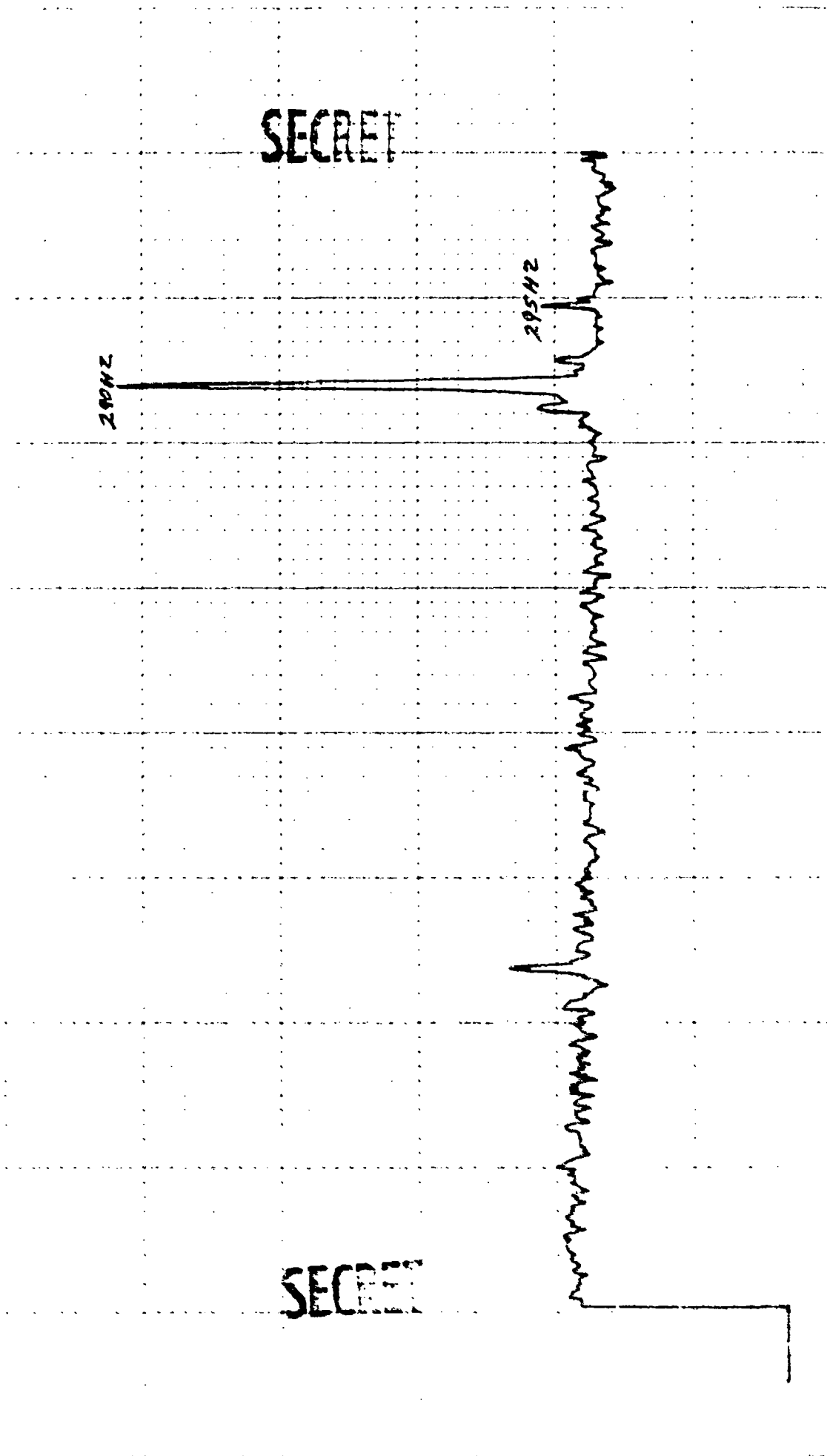
46.0704

CONTROL: 0202-16 (227)
BEAMFORMED SPECTRUM: ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-30 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILLED
ATTN: -24 DB
WTC: HANNING

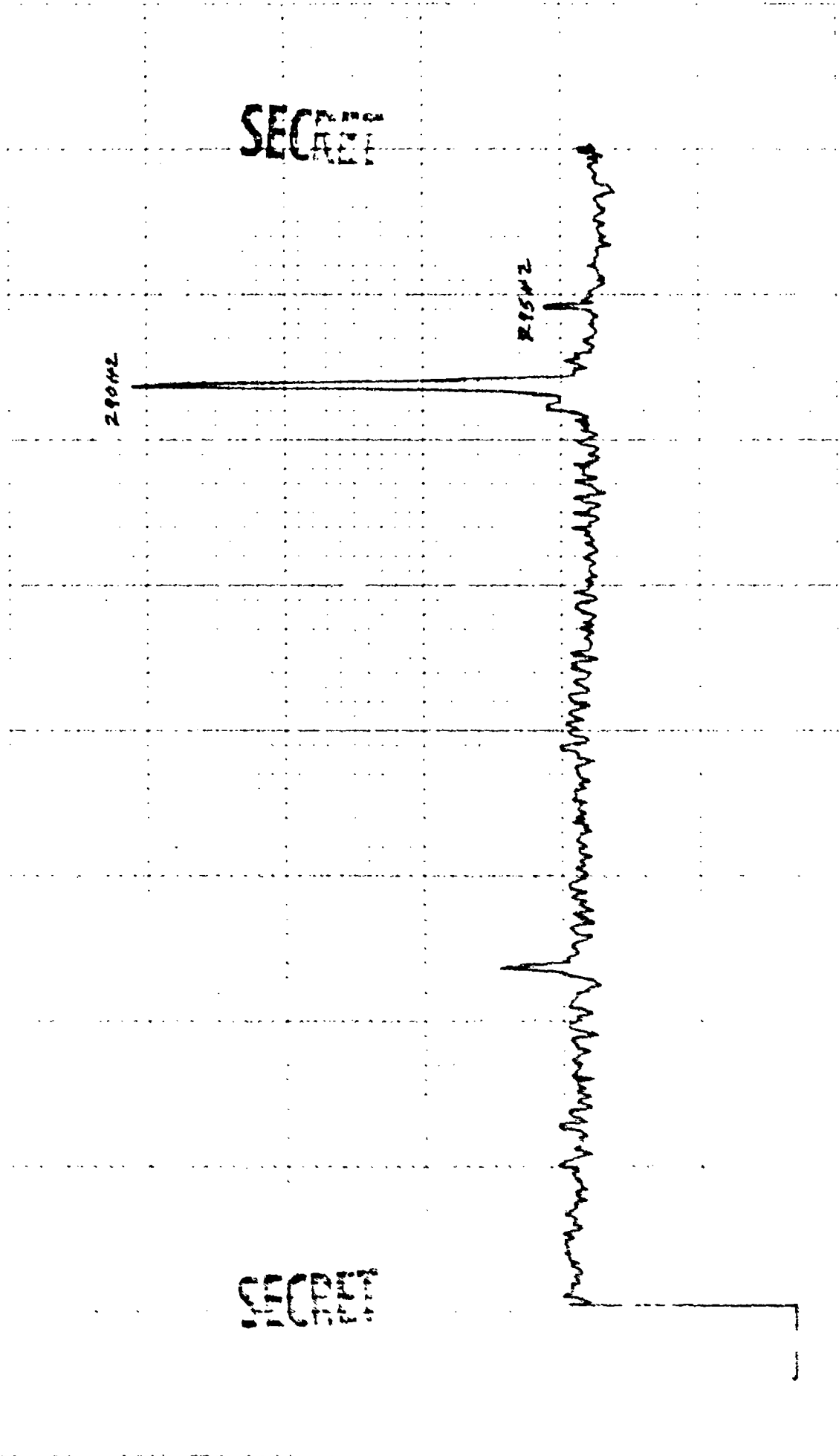
INDE X 045



100 000 000 000

46 0/03

CONTROL: 0202 - J6 (007) DATE OF ANALYSIS: 1-1-68 INDEX: X/VS
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTER: -24 DB
EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10 HZ WIG: HANNING
CENTER FREQ: 280 HZ -32 DEC. AZ STEERING



46 0703

CONTROL: 0202-16 (b7)
BEAMFORMED SPECTRUM (EL
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

CONTROL: 0202-16 (b07)

EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10HZ
-34 DEG. AZ STEERING

REEL: F29

INTEGRATION TIME 320 SECS
FILT.FP

INDE X/145

ATTN: -24 DB
WTG: HANNING

SECRET

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46 0703

CONTROL: 0202-16 (207) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENTS) / - / 2
EXERCISE: BEARING STAKE DATE/TIME: 2-9-77 - 0202Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS - 36 DEG. AZ STEERING

REEL: F89 INDE X1145

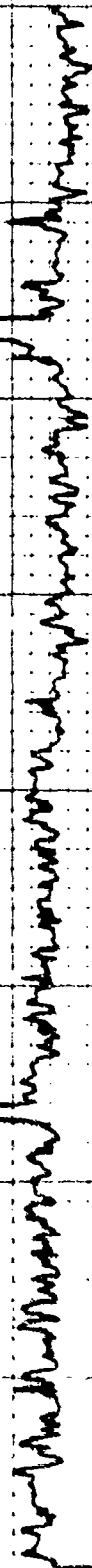
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTC: HANNING

SECRET

200HZ

205 HZ

SECRET



46 0703

CONTROL: 0202-16 (207)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-30 DEC. AZ STEERING

PEEL: F29
INTEGRATION TIME 320 SECS
FIU-50 WTC: HANNING
INDEX: 1/45
ATTEN: -24 DB

SECRET

SECRET

290 HZ

295 HZ

Handwritten notes and scribbles across the grid.

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-25.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-15.1	
BEAMFORMER GAIN	<u>+30</u>	+14.9	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+15.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-67.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.3	
BEAMFORMER GAIN	<u>+30</u>	-27.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+14.9</u>	
SIGNAL LEVEL FOR SNR	<u>-27.3</u>	+2.2	
PROCESSOR CORRECTION	<u>-4.0</u>	-8.2	
MRA CORRECTION	<u>+ .2</u>	39.4	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	30	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-28.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-18.5</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+11.5</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+12.3</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-63.8</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-33.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+11.5</u>	
SIGNAL LEVEL FOR SNR	<u>-33.8</u>	<u>45.3</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>40.3</u>	
MRA CORRECTION	<u>+ .8</u>	<u>41.1</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>32.9</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-54.7</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-24.7</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-23.9</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-63.6</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-33.6</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-24.7</u>	
SIGNAL LEVEL FOR SNR	<u>-33.6</u>	<u>8.9</u>	
PROCESSOR CORRECTION	<u>-4.2</u>	<u>4.7</u>	
MRA CORRECTION	<u>+ .8</u>	<u>5.5</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	<u>-2.7</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 7

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u></u>
MRA SIGNAL LEVEL	<u>+15.1</u>	<u>+12.3</u>	<u>- 23.9</u>
ARRAY SIGNAL GAIN	<u>31.1</u>	<u>29.8</u>	<u></u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u></u>
# of elements			
DIFFERENCE	<u>+1.0</u>	<u>- .3</u>	<u></u>

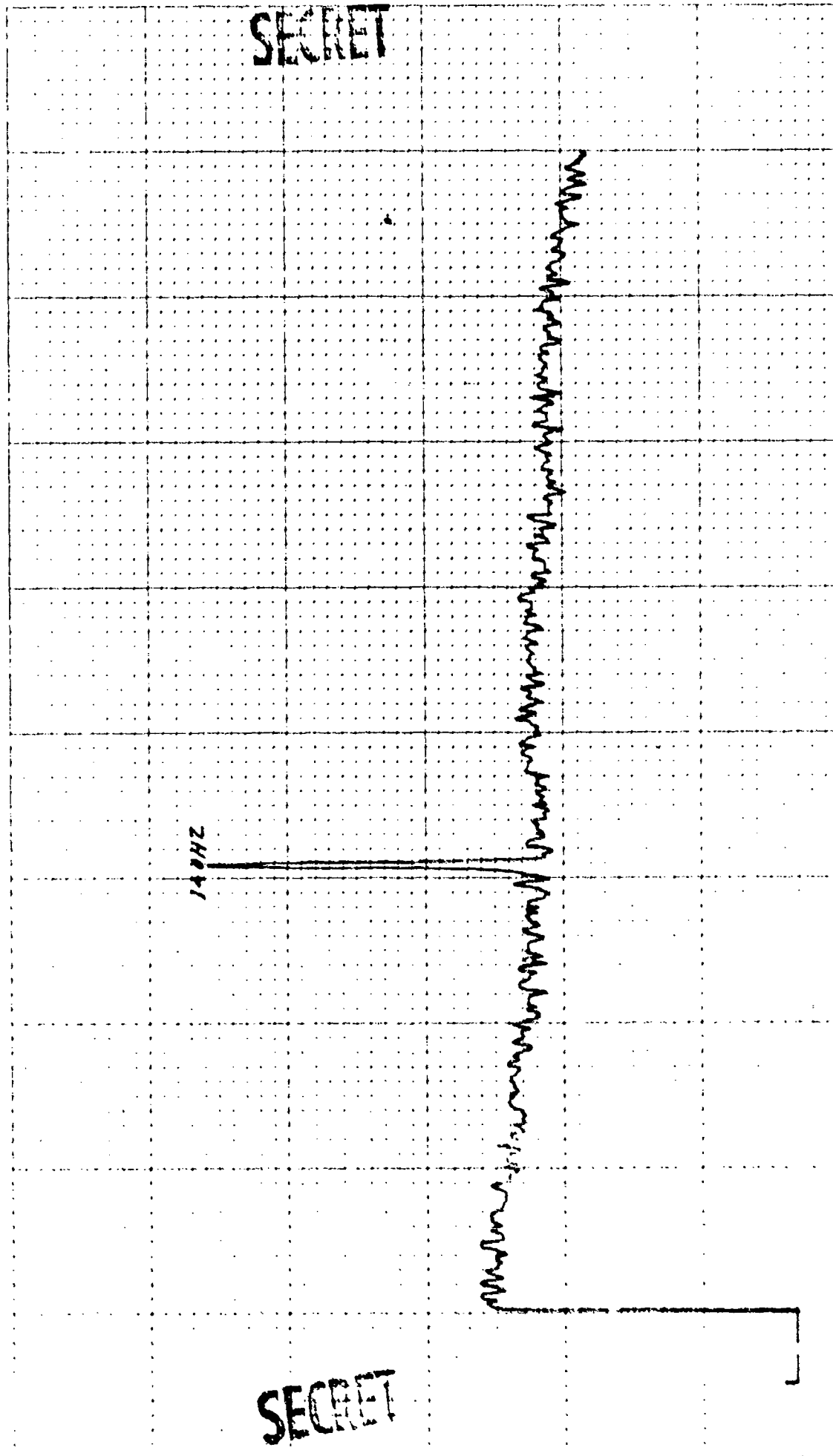
ARRAY GAIN

MRA SNR	<u>38.2</u>	<u>41.1</u>	<u>5.5</u>
MEAN OMNI SNR	<u>30.1</u>	<u>32.5</u>	<u></u>
ARRAY GAIN	<u>8.3</u>	<u>8.6</u>	<u></u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.5</u>	<u>14.7</u>	<u>15.1</u>
DIFFERENCE	<u>-4.2</u>	<u>-6.1</u>	<u></u>

CONFIDENTIAL

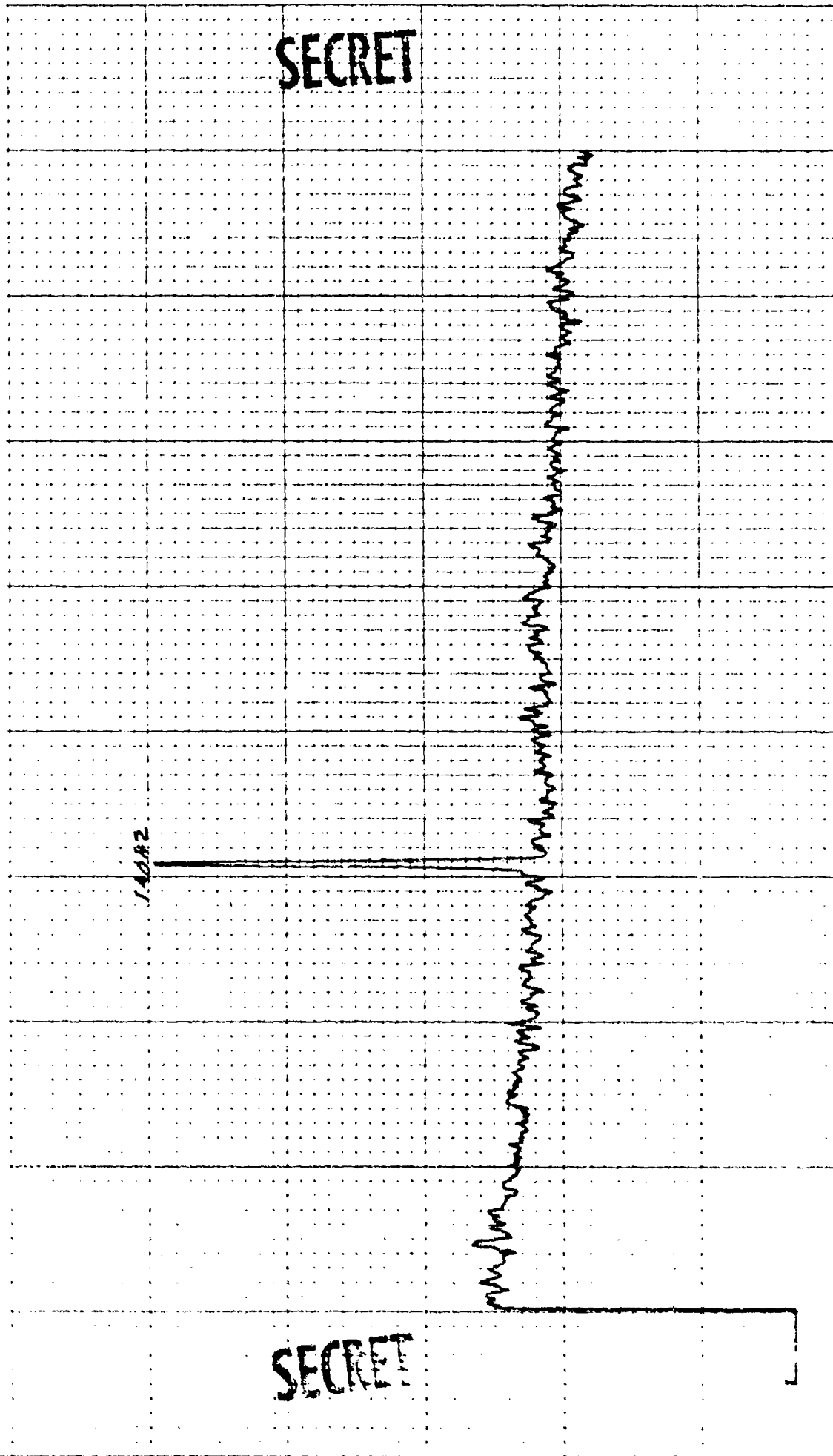
45 0/03

CONTROL: 0202 - J2 (DPT) REEL: F09 INDE X/195
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-82 20-34
EXERCISE: BEARING STAKE DATE/TIME: 08-77 - 0202Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS - 12 DEG. AZ STEERING



46 0703

CONTROL: 0202-32 (007) DATE OF ANALYSIS: 1-26-77 28-34 REEL: F29 INDE X/195
BEA'HFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 -0202.2 INTEGRATION TIME 320 SECS ATTEN:-20DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ -14 DEC. AZ STEEPING



46 0703

CONTROL: 0202-32 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-82
DATE/TIME: 2077 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 16 DEG. AZ STEERING

REEL: F39
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
WTC: HANNING

INDE X/145

14 PHZ

SECRET

SECRET

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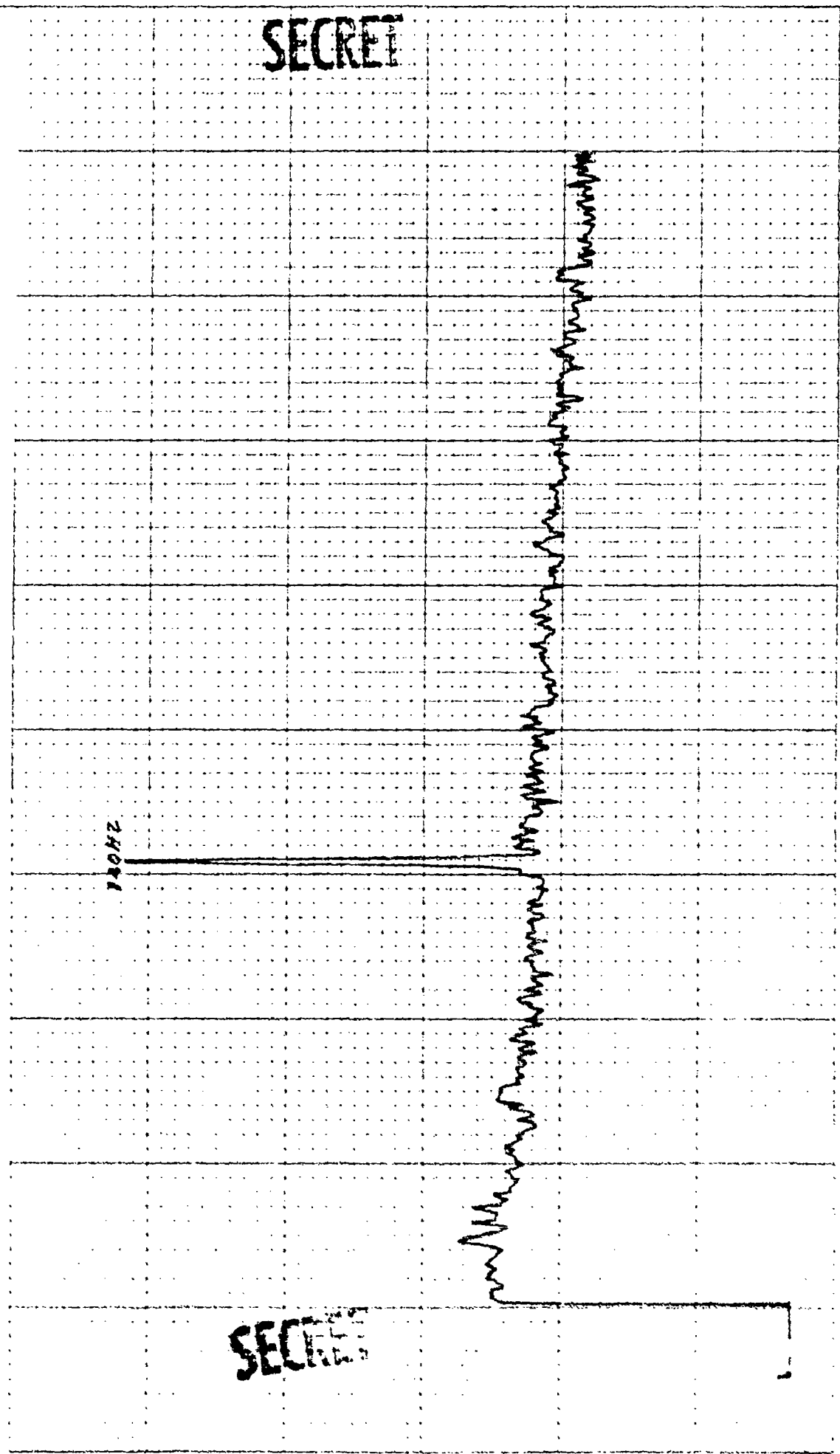
46 0703

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - 26 8 21 - 34)
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-- 10 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30DB
FILTER
WTG: HANNING

INDE X/45



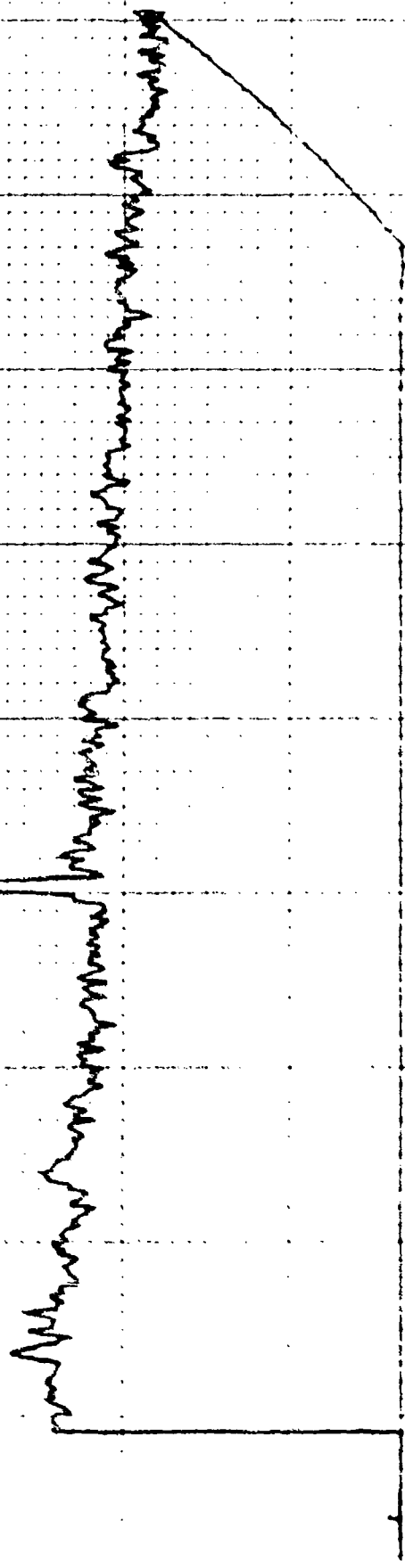
46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-89-34 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 -0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ -20 DEG. AZ STEERING

140HZ

SECRET

SECRET



66 0763

CONTROL: 0202-32 (207)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-81-34
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-2/5 DEG. AZ STEERING

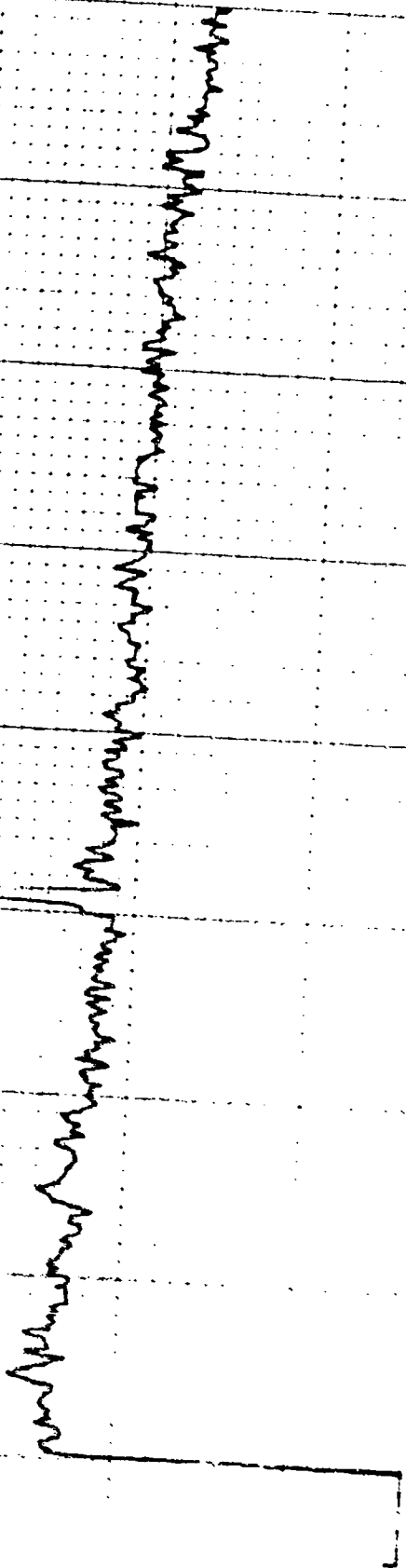
REEL: F29
INTEGRATION TIME 320 SECS
FILTERED
ATTN: -20DB
WTC: HANNING

INDE X/145

13042

SECRET

SECRET



46, 67, 68

CONTROL: 0202 - J2 (DPT)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
J2 ELEMENTS
DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-27-2022
ANALYSIS BANDWIDTH: 1/10HZ
- 22 DEG. AZ STEERING
INTEGRATION TIME 320 SECS
FILTER
ATTEN: 30 DB
WTC: HANNING
REEL: F89
INDEX 1/45

14042

SECRET

SECRET

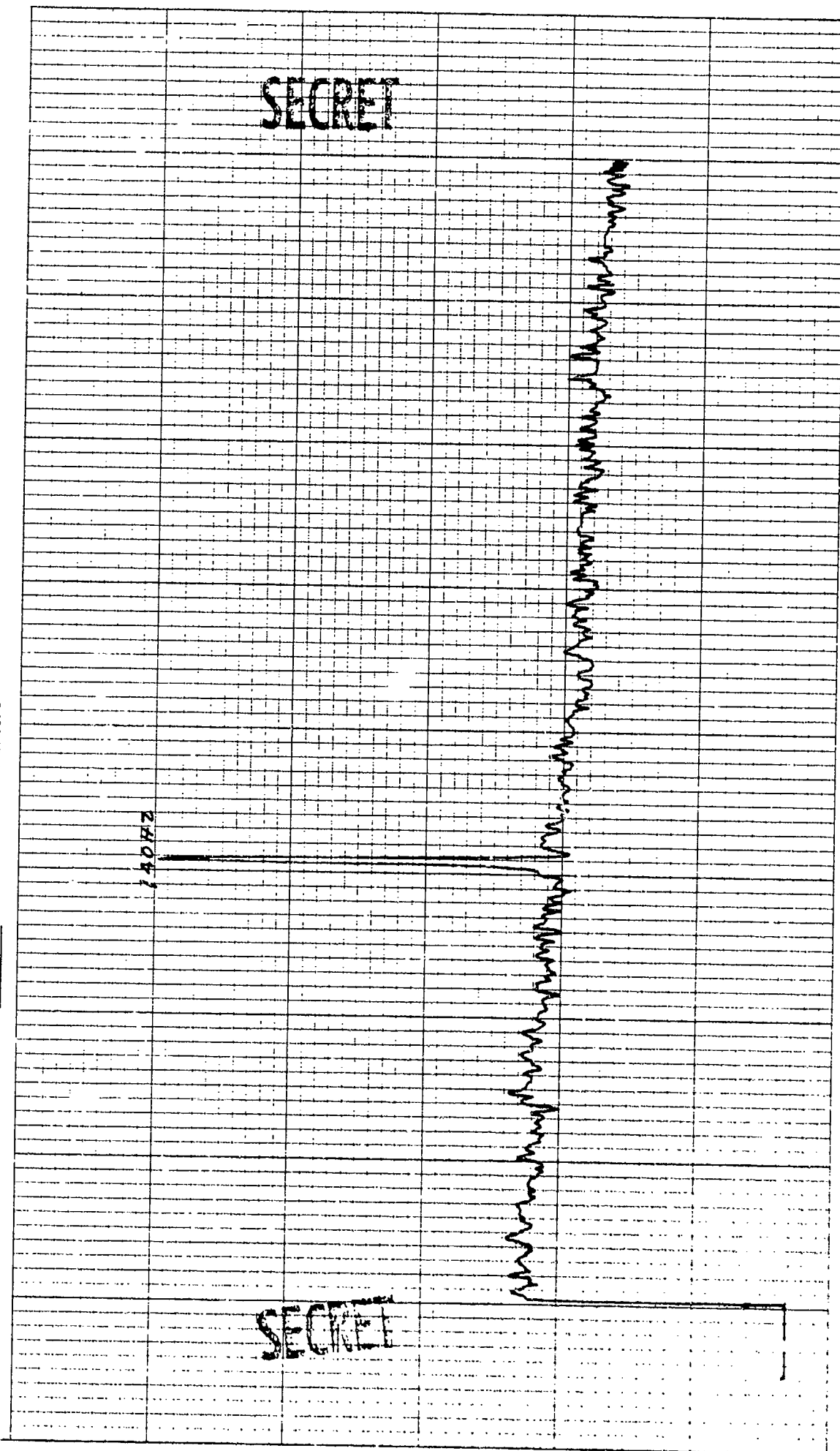
46 0703

CONTROL: 0202 - 32 (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-24 DEG. AZ STEERING

REEL: F29
INDE X/145

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



45 0703

CONTROL: 0202-30 (107)
BEAMFORMED SPECTRA ELEMENTS
EXERCISE: BEARING, STAYE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - -
1-26-89-53
DATE TIME: 2-8-77 - 0202.2
ANALYSIS: BANDWIDTH: 110 HZ
-26 DEG. AZ STEERING

FEEL: F29
INDE: 1/145
INTERPOLATION TIME 320 SECS
ATTEN: -20 DB
FREQ: 150 HZ
WTC: HANNING

140 HZ

SECRET

SECRET

Handwritten notes in cursive script, likely describing the data or analysis process.

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14042

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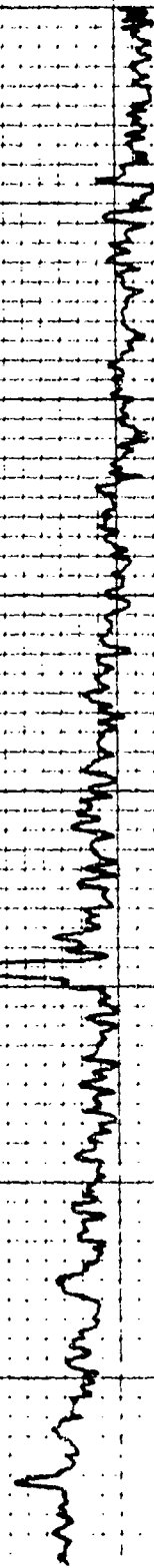
46 0703

1-2-2 10:10 TO THE DEPT. OF DEFENSE
1-2-2 10:10 TO THE DEPT. OF DEFENSE

CONTROL: 02021-32 (DPT) DATE OF ANALYSIS: 1-2-2 10:10
BEAMFORMED SPECTRUM(ELEMENTS) REEL: F29 INDE X/145
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ FILTER WTC: HANNING
32 ELEMENTS -32 DEG. AZ STEERING

SECRET

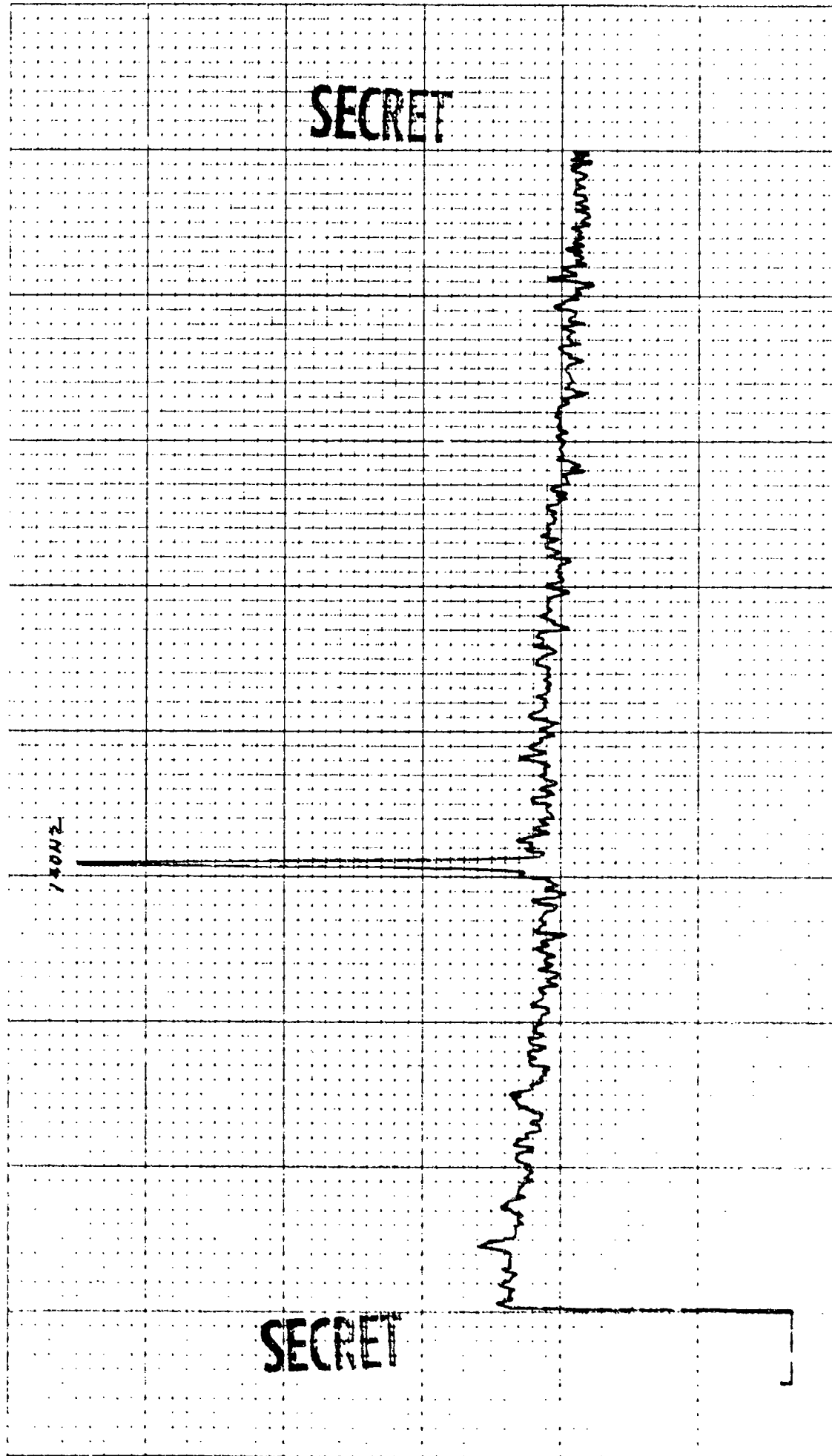
SECRET



46 0703

1402 14 0000 1000000 1000000

CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: 1-26-77 29-34 REEL: F29 INDE X 1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202.2 INTEGRATION TIME 320 SECS ATTN: 30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ
32 ELEMENTS -33 DEG. AZ STEERING



1-28 10 10 TO THE HONORABLE SENATOR

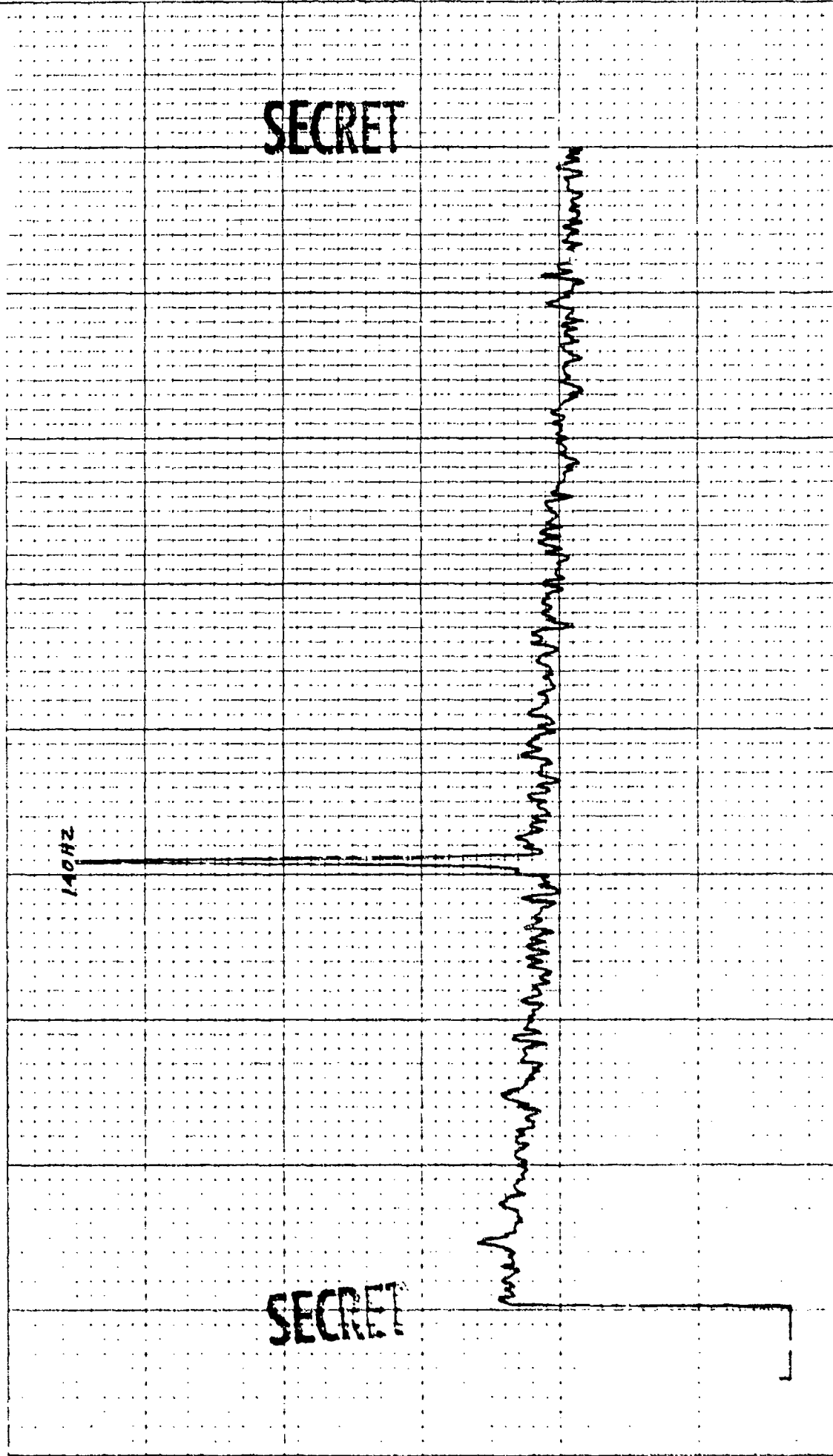
46 0703

CONTROL: Q202-32 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
22 ELEMENTS

DATE OF ANALYSIS: 1-26-88-34
DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-34 DEG. AZ STEERING

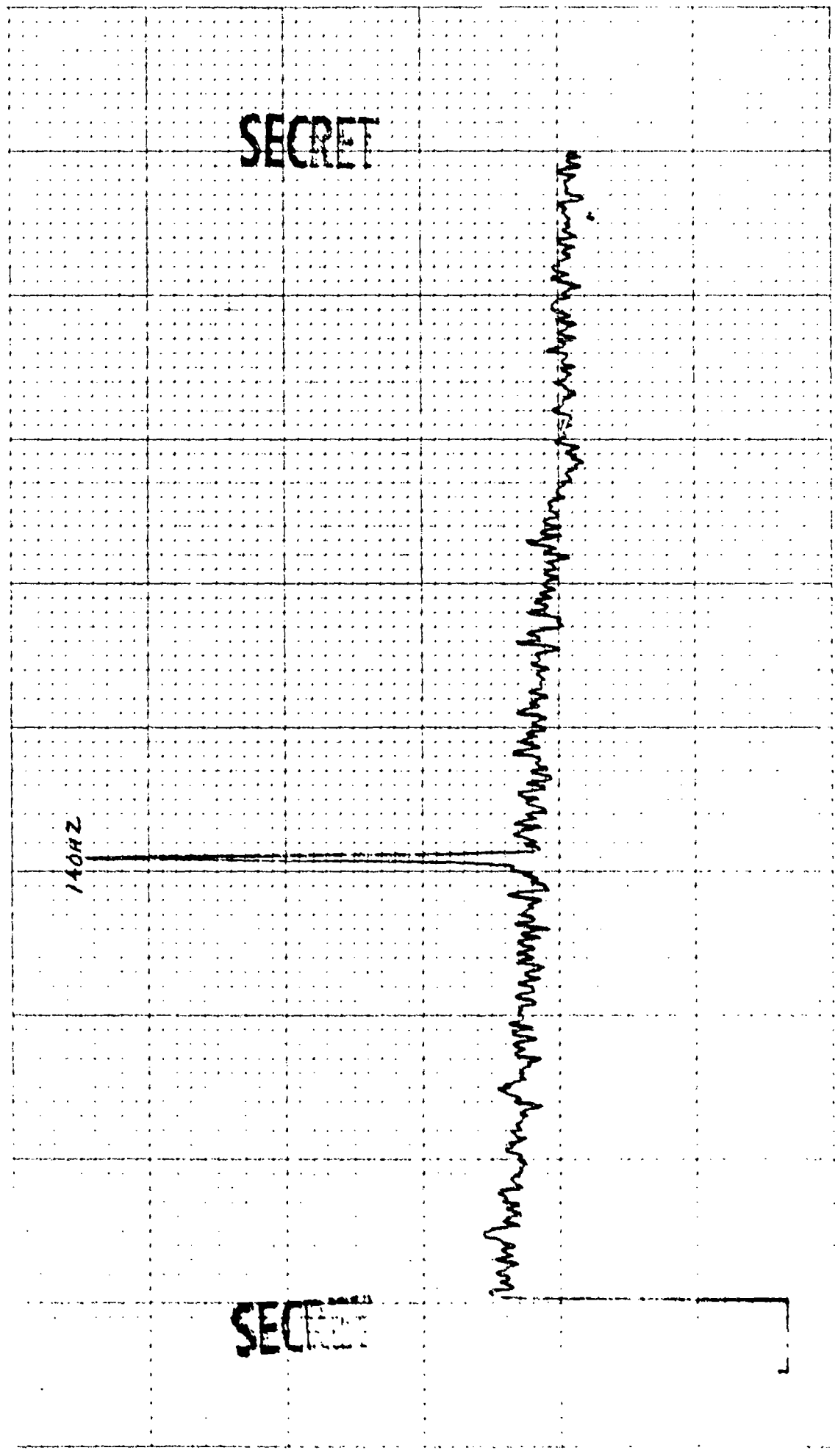
REEL: F29
INTEGRATION TIME 320 SECS
FILTFR
ATTEN: -30 DB
WTG: HANNING

INDE X 1/45



46 0703

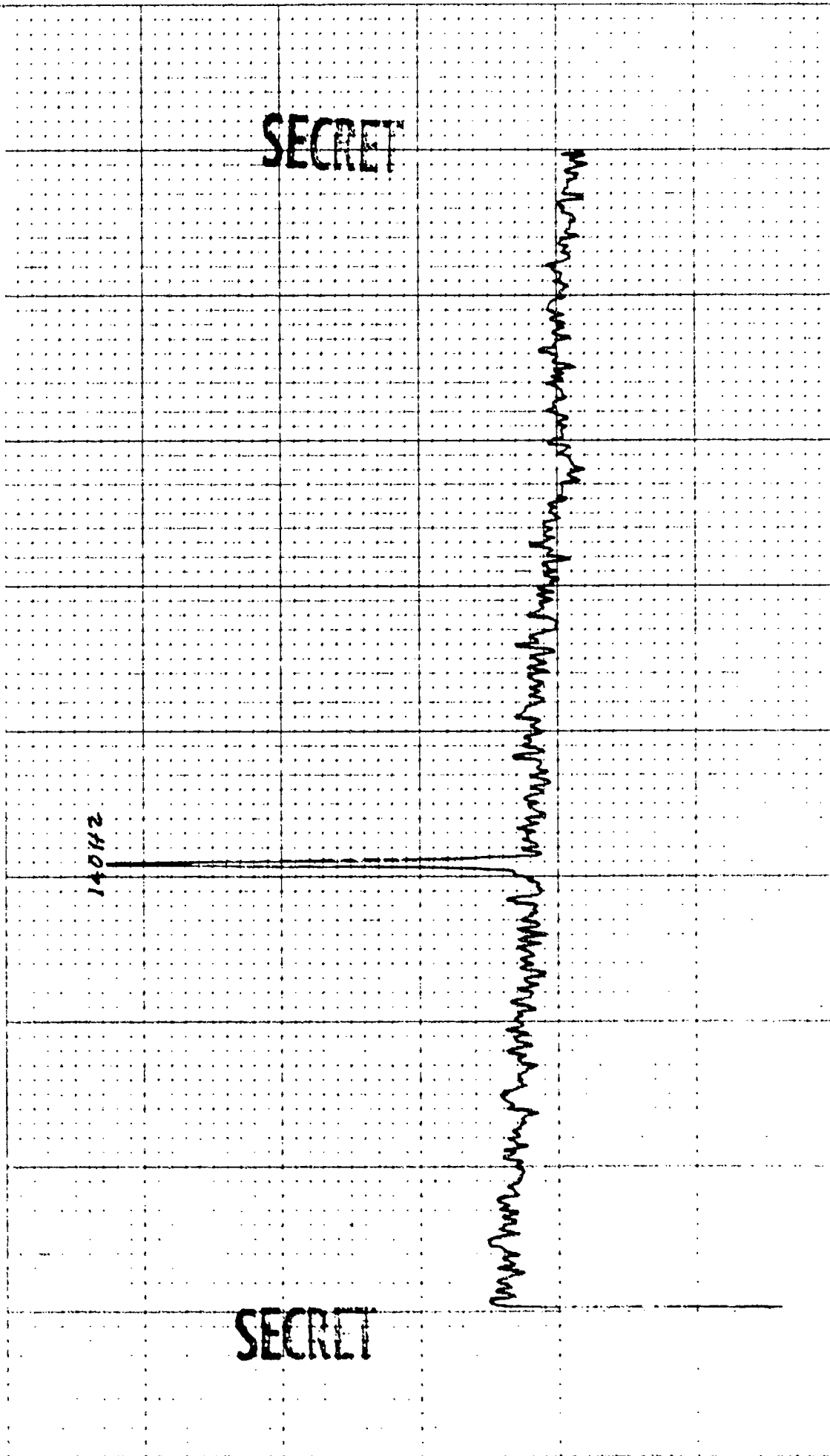
CONTROL: 0202- 32 (DP7) DATE OF ANALYSIS: 1-26-89-34 REEL: F29 INDEX: 1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTERED WTG: HANNING
CENTER FREQ: 150 HZ ~ 36 DEG. AZ STEERING



Handwritten note: 140HZ is the center frequency of the bearing stake exercise.

46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-82-34 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTEN:-30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ -38 DEG. AZ STEERING



2011

DATE OF ANALYSIS: - - -

CONTROL:0202-32 (DP7)

1-26 of 29-34)

DATE/TIME: 2-8-77 -0202Z

ANALYSIS BANDWIDTH: 1/10HZ

-40 DEG. AZ STEERING

SECRET

100 Hz

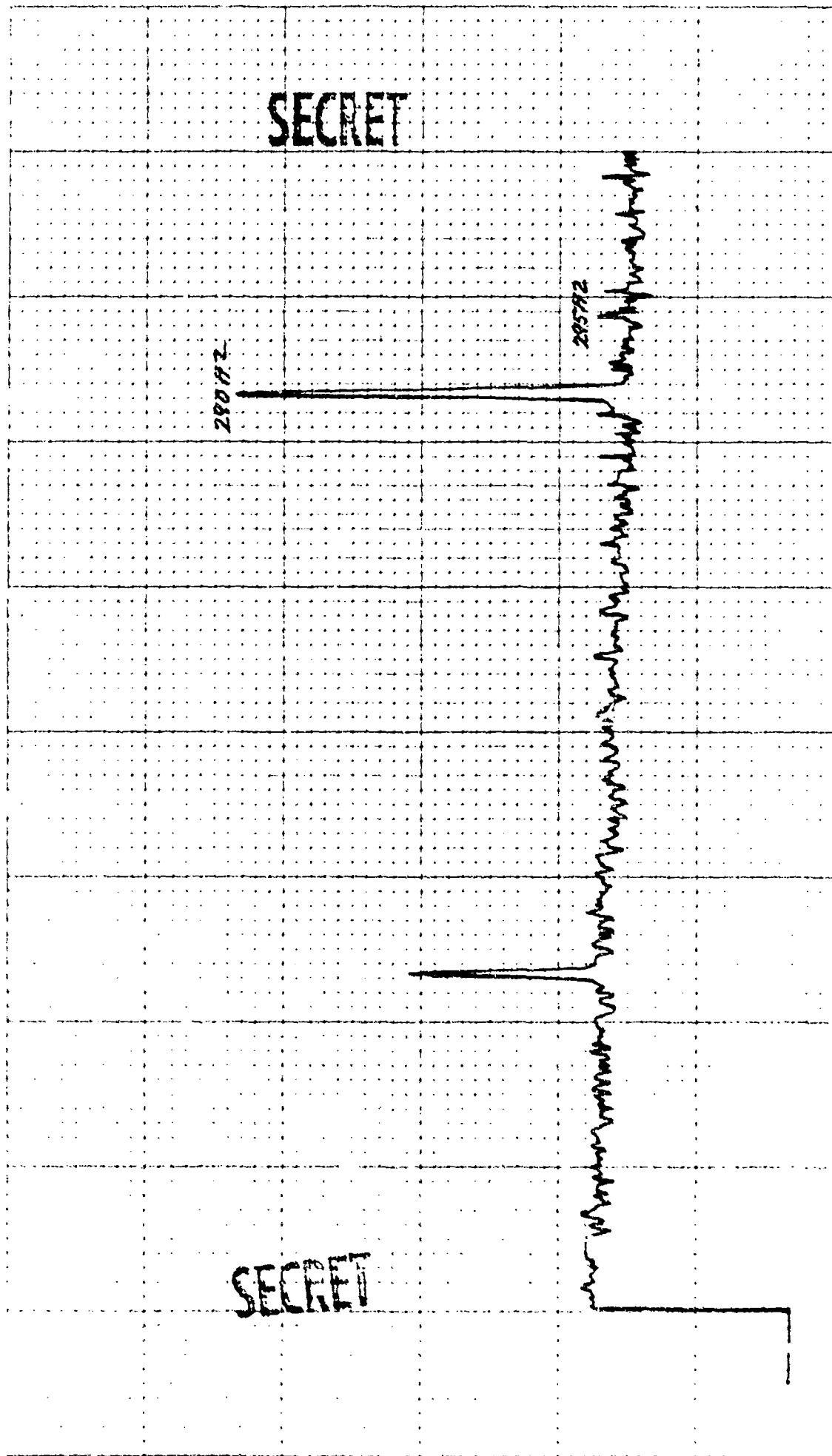
SECRET

46 0703

CONTROL: 0202-32 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34
DATE/TIME: 28-77-0202Z
ANALYSIS BANDWIDTH: 1/1017
-12 DEC. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING
INDE X 1/45

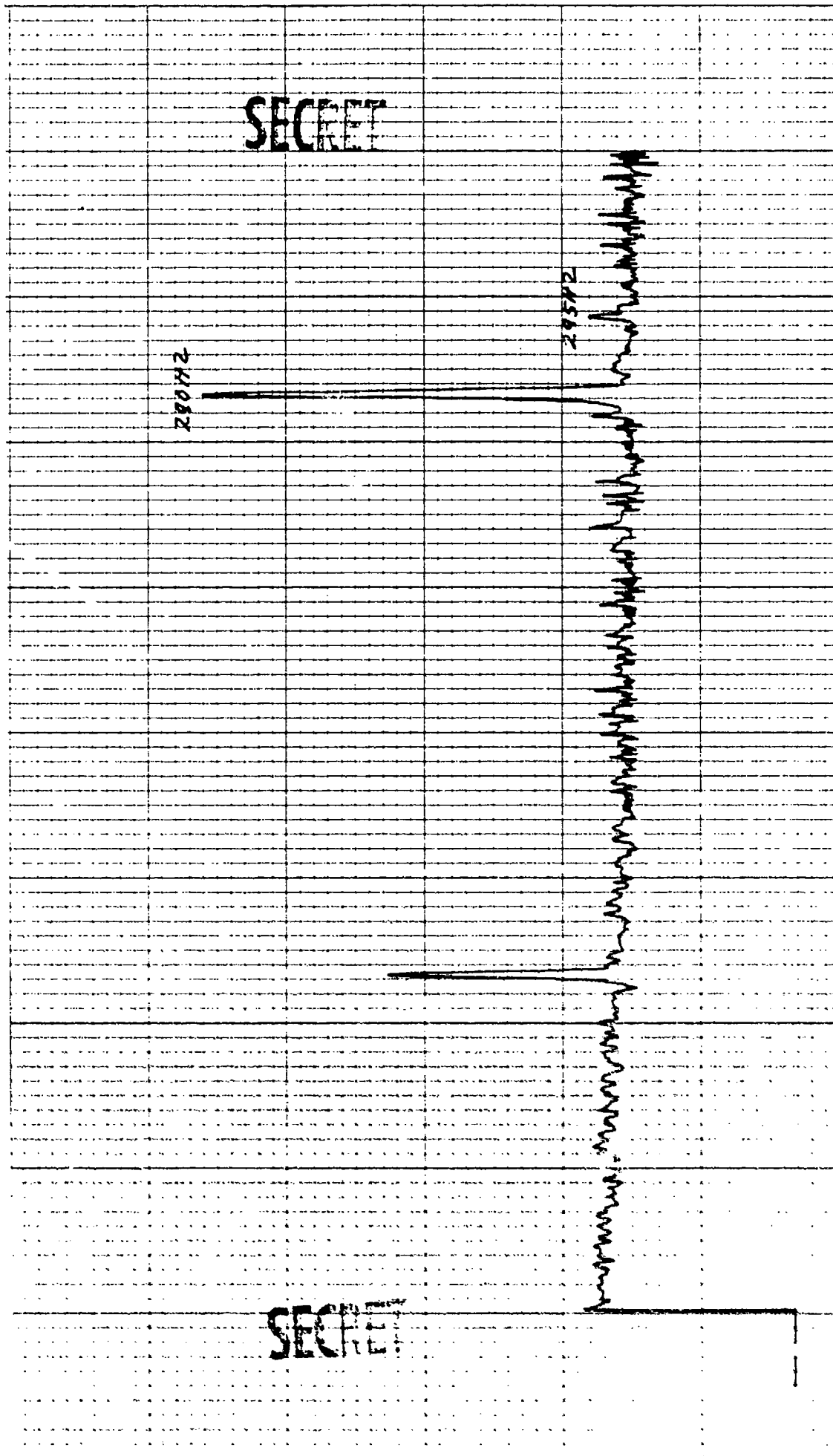


46 0703

1 (X) 10A 16 TO 10A 18 05: 1000000

CONTROL: 0202 - 72 (207) DATE OF ANALYSIS: 1-268/29-34) INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
CENTER FREQ: 280 HZ -14 DEG. AZ STEERING

32 ELEMENTS



46 0753

CONTROL: 0202-32 (0P7)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 2800HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-84
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-16 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILTER: WTC: HANNING

INDE X 1145

SECRET

SECRET

2800HZ

2850HZ

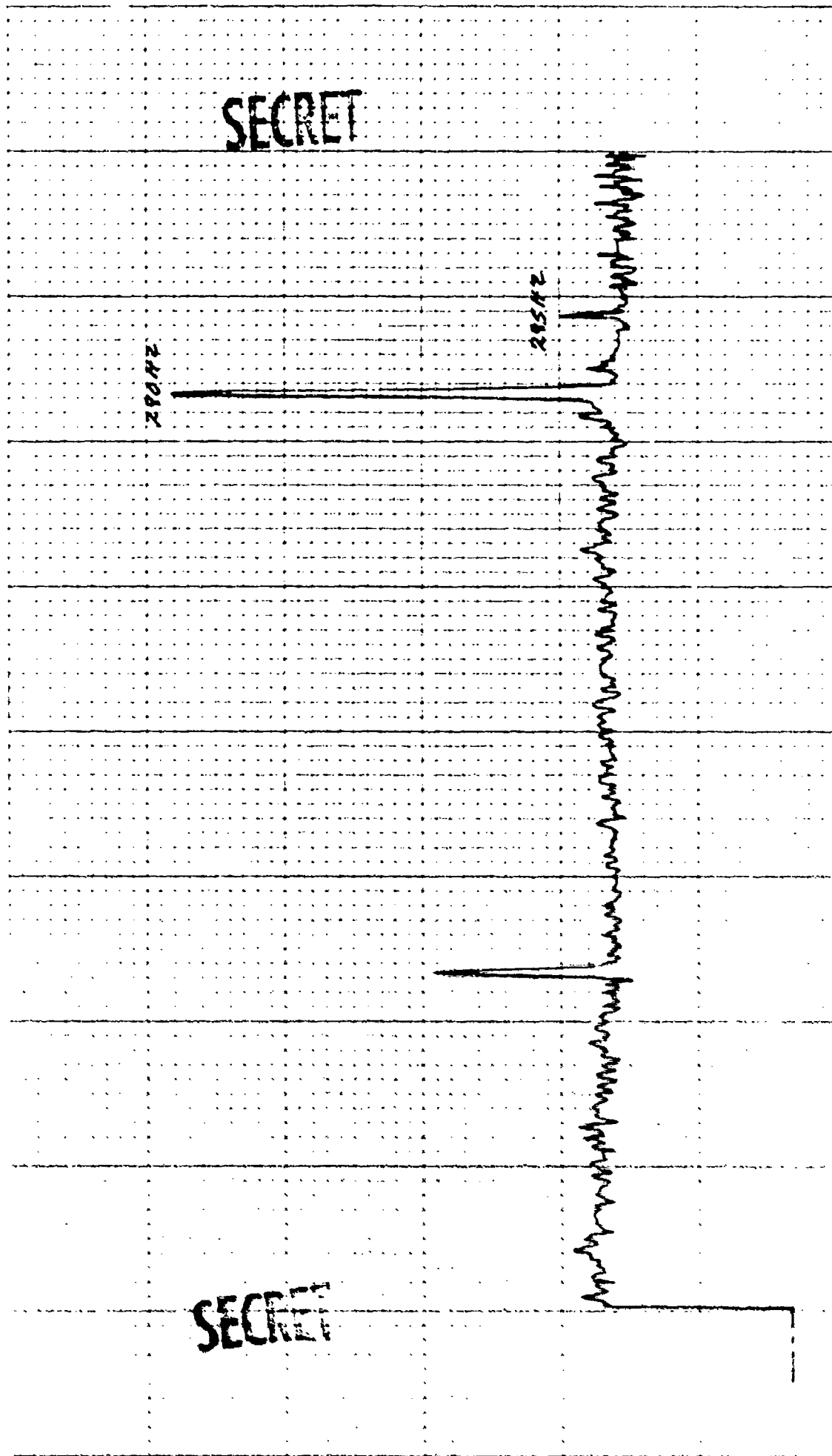
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46 0703

CONTROL: 0202-32 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

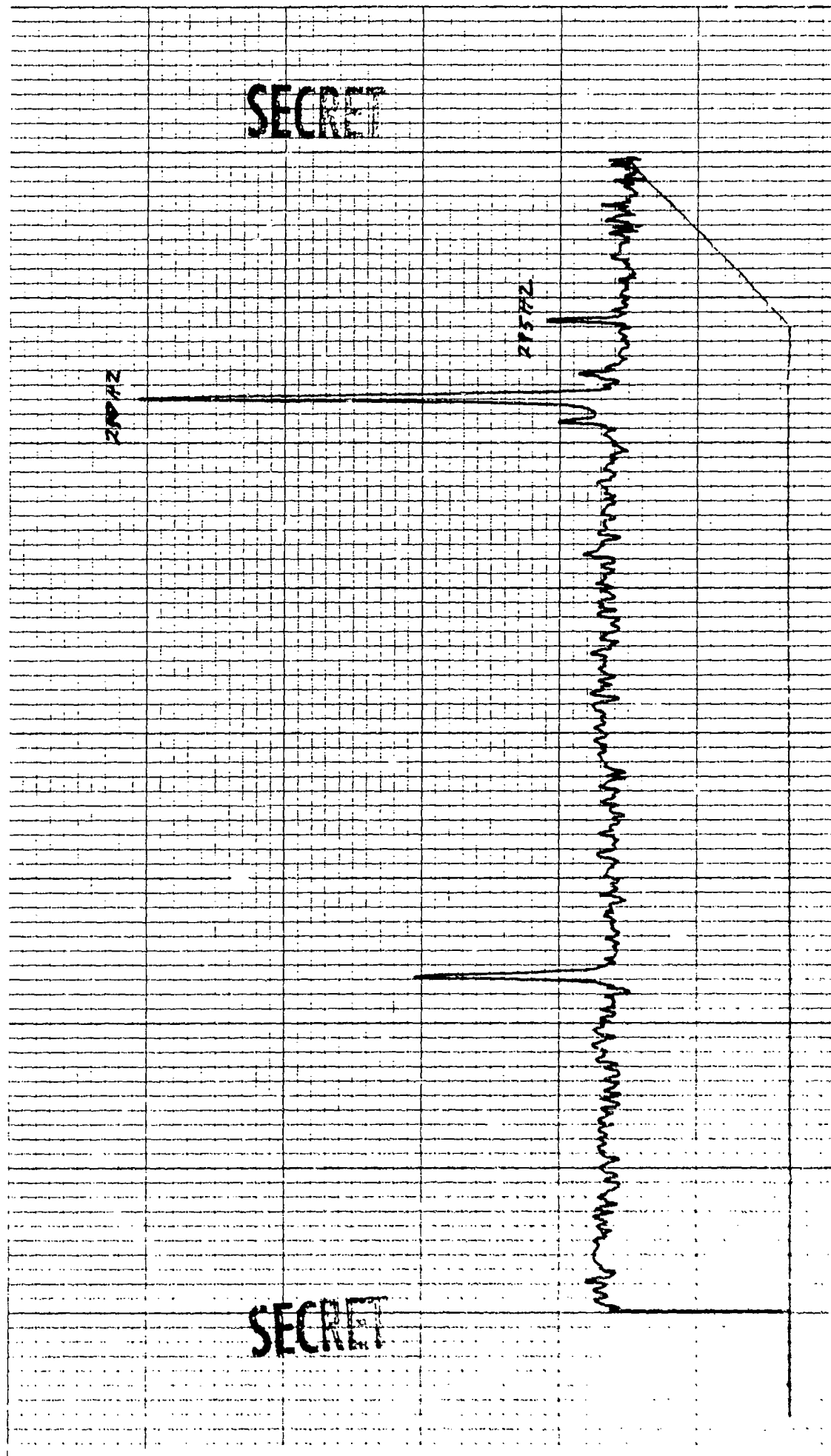
DATE OF ANALYSIS: 1-26-80 09-34
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-10 DEG. A2 STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILTER
ATTN: -20 DB
WTG: HANNING
INDEX: 1/45



46 0703

CONTROL: 0202-32 (DPT) REEL: F28 INDE X/135
BEAMFORMED SPECTRUM(ELEMENTS) /-26 & 28-34) ATTN: -30 DB
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS FILTER WTG: HANNING
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS -20 DEG. AZ STEERING



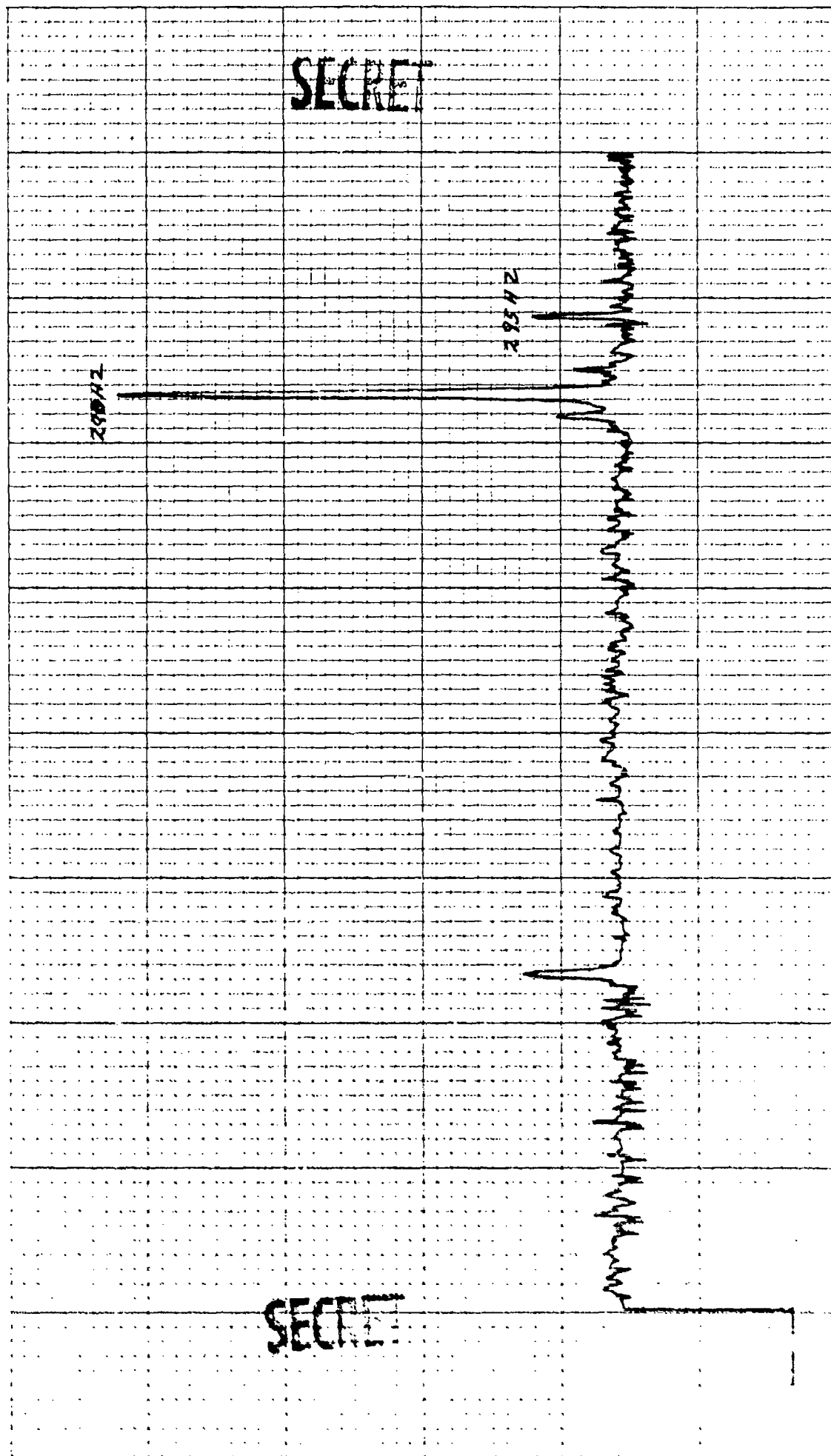
46 0703

CONTROL: 0202 - 51 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 20-77 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-2/5 DEG. AZ STEERING

REEL: F24
INTEGRATION TIME 320 SECS
FILTER
WTG: HANNING

INDE X 1/03



46 0703

CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-268 28-34)
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202 Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS - 32 DEG. AZ STEERING

REEL: F39

INDE X 1145

INTEGRATION TIME 320 SECS
ATTN: -30 DB
FILTER WTC: HANNING

SECRET

SECRET

280 HZ

285 HZ

280 HZ 285 HZ

1-26 10.7 TO THE INCH. 1-26 10.7

46 0703

CONTROL: 0202-32 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-24 DEG. AZ STEERING

REEL: F39
INTEGRATION TIME 320 SECS
FILTER

INDE X/145
ATTEN: 30 DB
WTG: HANNING

SECRET

SECRET

250 HZ

250 HZ

SECRET

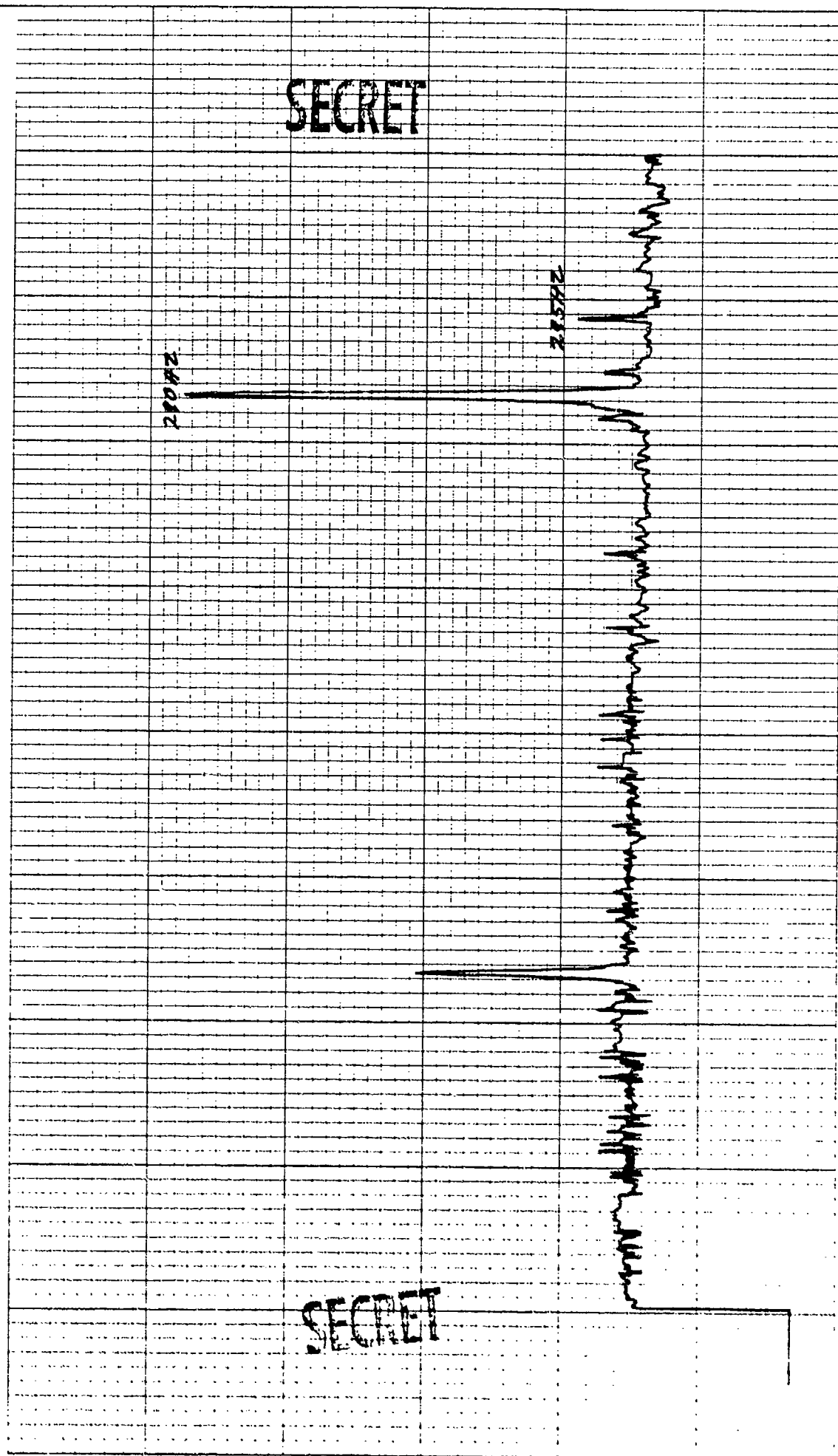
10 X 10 TO THE INCHES
KODAK SAFETY FILM

46 0703

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-8-77-0202 Z
ANALYSIS BANDWIDTH: 1700 HZ
-26 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILTER
ATTN: -30 DB
WTG: HANNING
INDE X 1145



10-4-10 TO THE INCHES
REUTERS & ESSER CO. MADE IN U.S.A.

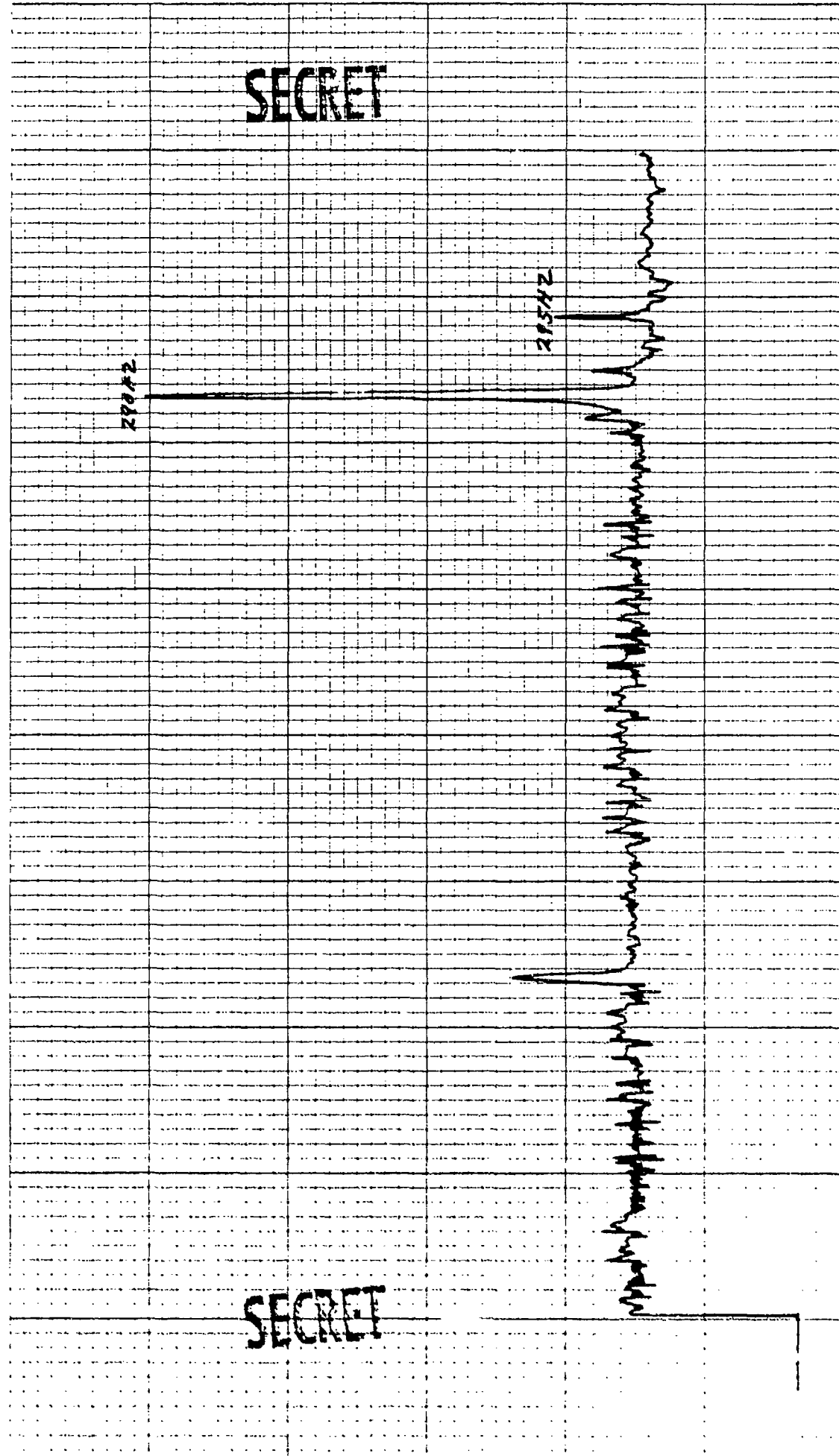
46 0703

CONTROL: 0202 - 32 (D07)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 20-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 28 DEG. AZ STEERING

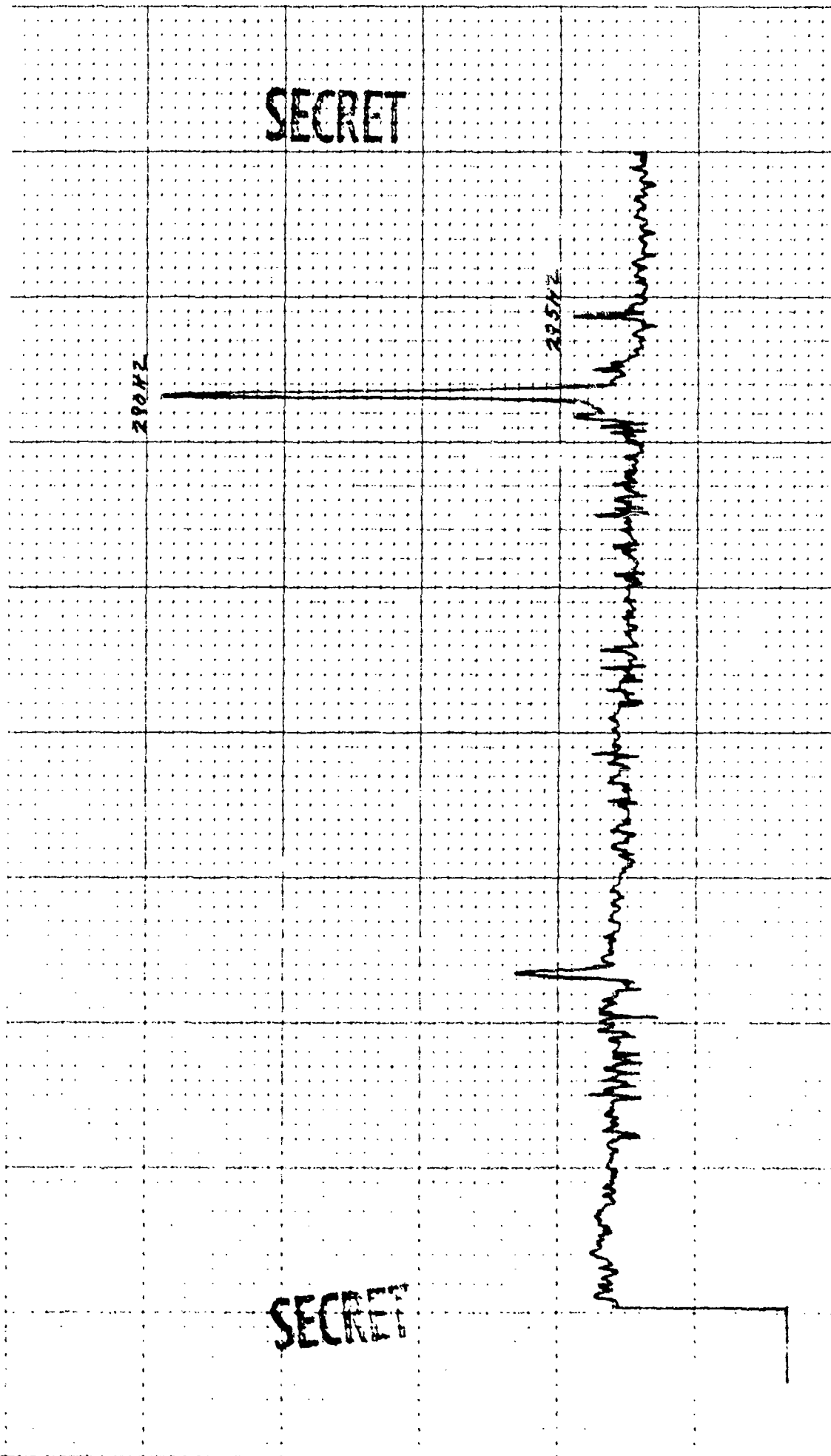
REEL: F09
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING

INDE X 1145



46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-77-0202Z REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN:-30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ +30 DEG. AZ STEERING



46 0703

CONTROL: 0202-32 (007) DATE OF ANALYSIS: 1-26-54 REEL: F39 INDE K/145
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS - 32 DEG. AZ STEERING

SECRET

SECRET

280 HZ

285 HZ

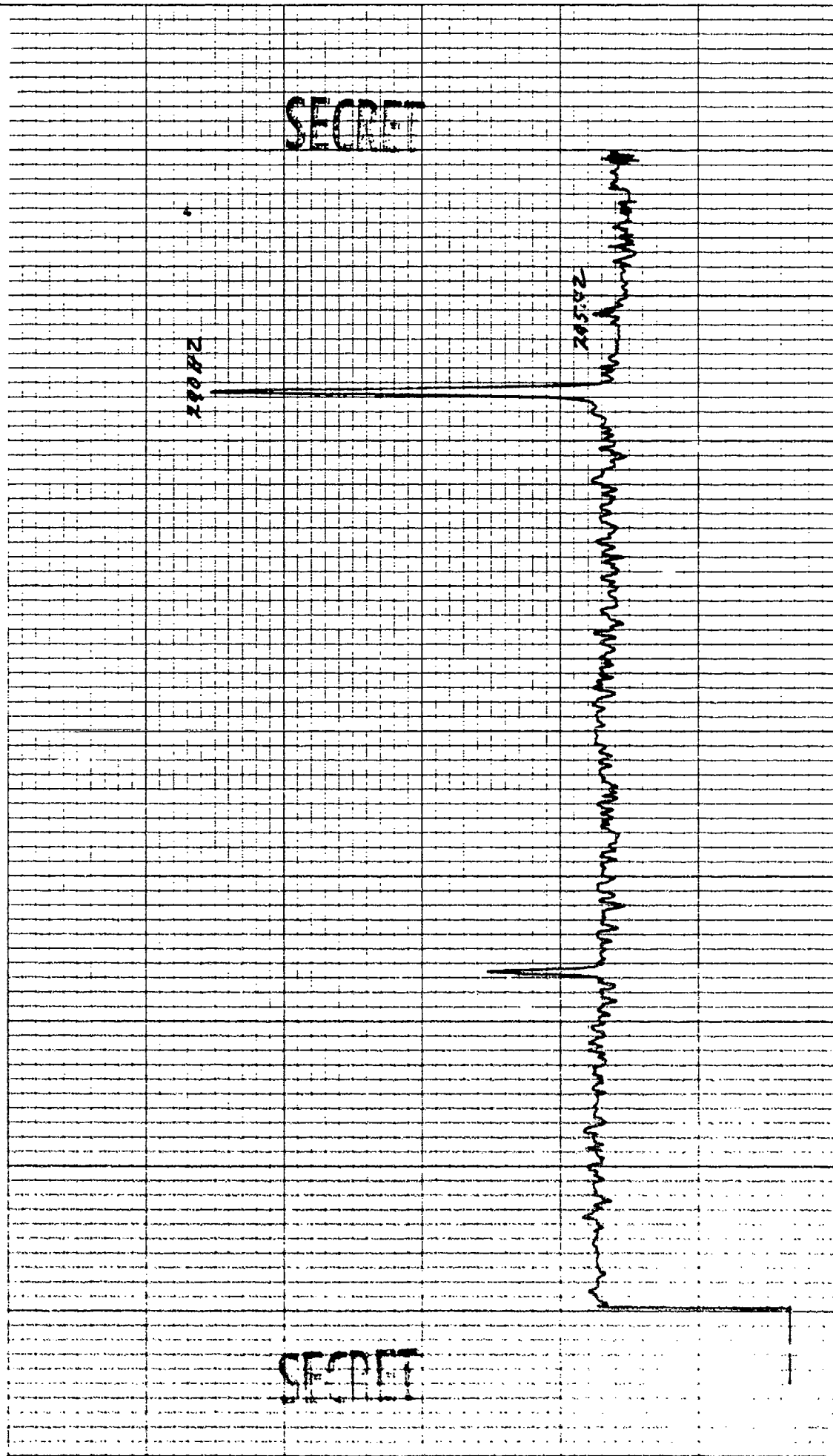
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16-2 10 X 10 TO THE INCH • X 100 LITERS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0202 - 32 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
- 33 DEG. AZ STEERING

REEL: F29
INDE X1145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER
WTG: HANNING



46 0703

INDEX X 1145.

REEL: F29

INTEGRATION TIME 320 SECS ATTN:-30 DB
 FILTER WTG: HANNING

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-34 DEG. AZ STEERING

CONTROL: 0202-32 (D07)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

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2010年12月31日

CONTROL: 0202-32 (D07) REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-77 INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z FILTFR WTG: HANNING
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
72 ELEMENTS -36 DEG. AZ STEERING

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2002

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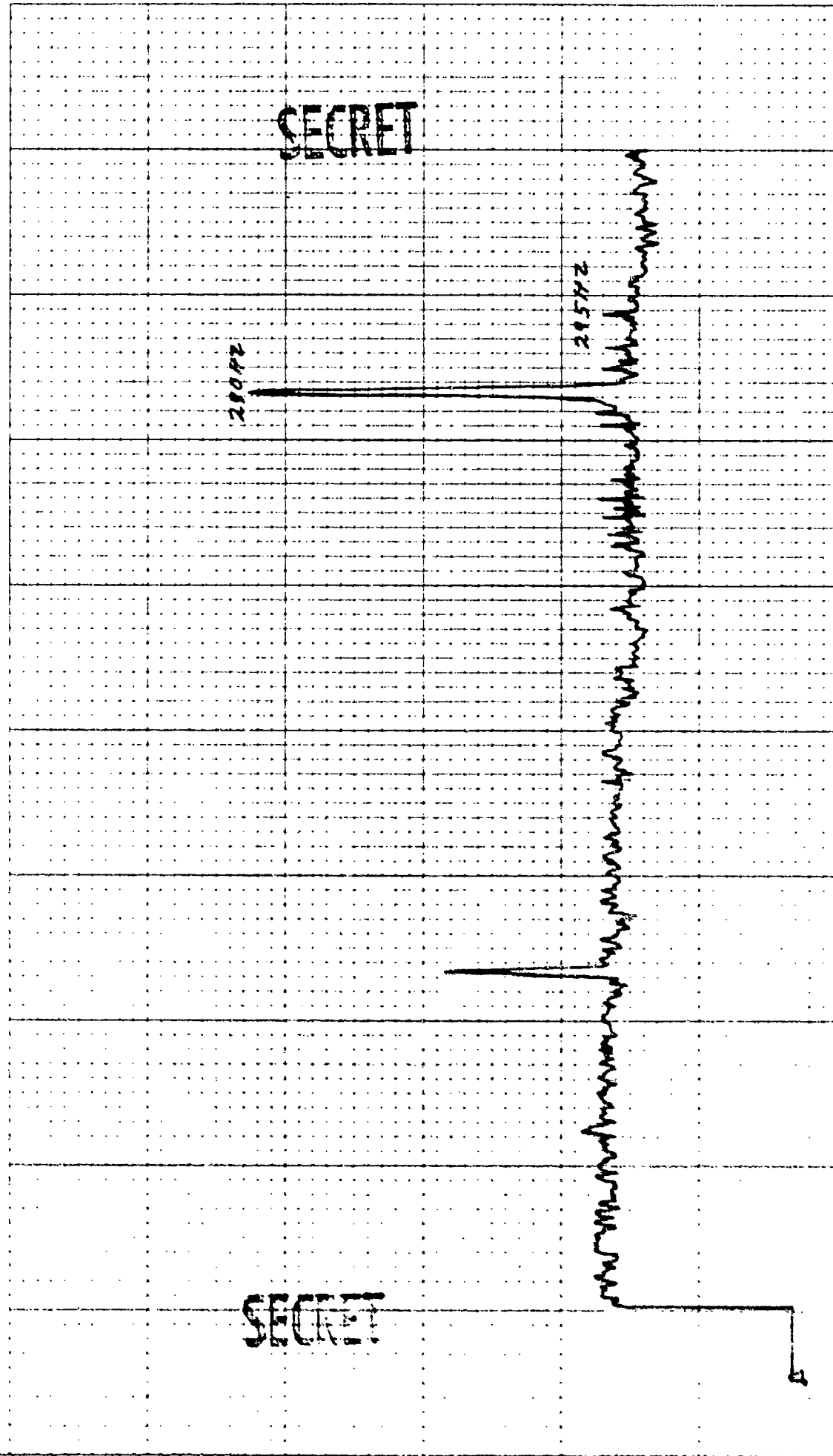
46 0703

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 28-34
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-30 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILT.FP
WTC: HANNING

INDE X/115



46 0703

CONTROL: 0202 - 32 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-88-34)
DATE/TIME: 2-1-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-40 DEG. AZ STEERING

REEL: F21
INTEGRATION TIME 320 SECS
FII.TFR
ATTEN: 20 DB
WTG: HANNING
INDEX 1/45

200HZ

205HZ

SECRET

SECRET

CONFIDENTIAL

1. *[Faint, illegible text]*

2. *[Faint, illegible text]*

3. *[Faint, illegible text]*

4. *[Faint, illegible text]*

5. *[Faint, illegible text]*

	<u>-16.2</u>	
-25.5	41.7	
-4.2	37.7	
+ .2	37.9	SNR 1/10 HZ BAND
-8.2	29.7	SNR 1 HZ BAND

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL
 SIGNAL LEVEL AND SNR
 CALCULATIONS
 FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

DATA POINT 7

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED
 MCPS-32 CAL. CORRECTION
 BEAMFORMER GAIN
 MRA CORRECTION

	<u>-28.8</u>
<u>+10</u>	<u>-18.8</u>
<u>+30</u>	<u>+11.2</u>
<u>+ .8</u>	<u>+12.0</u>

SIG. LEVEL FOR SNR CALCULATION
 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED
 MCPS-32 CAL. CORRECTION
 BEAMFORMER GAIN

	<u>-71.6</u>
<u>+10</u>	<u>-61.6</u>
<u>+30</u>	<u>-31.6</u>

NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR
 SIGNAL LEVEL FOR SNR
 PROCESSOR CORRECTION
 MRA CORRECTION
 BANDWIDTH CONVERSION

	<u>+11.2</u>
<u>-31.6</u>	<u>+2.8</u>
<u>-4.0</u>	<u>38.8</u>
<u>+ .8</u>	<u>39.6</u>
<u>-8.2</u>	<u>31.4</u>

SNR 1/10 HZ BAND
 SNR 1 HZ BAND

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~~CONFIDENTIAL~~
SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-55.0</u>	
BEAMFORMER GAIN	<u>-30</u>	<u>-25.0</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-24.2</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-72.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-62.3</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-32.3</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-25.0</u>	
SIGNAL LEVEL FOR SNR	<u>-32.3</u>	<u>7.3</u>	
PROCESSOR CORRECTION	<u>-4.8</u>	<u>2.5</u>	
MRA CORRECTION	<u>+ .8</u>	<u>3.3</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>-4.9</u>	SNR 1 HZ BAND

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CONFIDENTIAL
DATA POINT 7

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+16.4</u>	<u>+12.0</u>	<u>-24.2</u>
ARRAY SIGNAL GAIN	<u>32.4</u>	<u>29.5</u>	<u> </u>
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>-1.7</u>	<u>-4.6</u>	<u> </u>

ARRAY GAIN

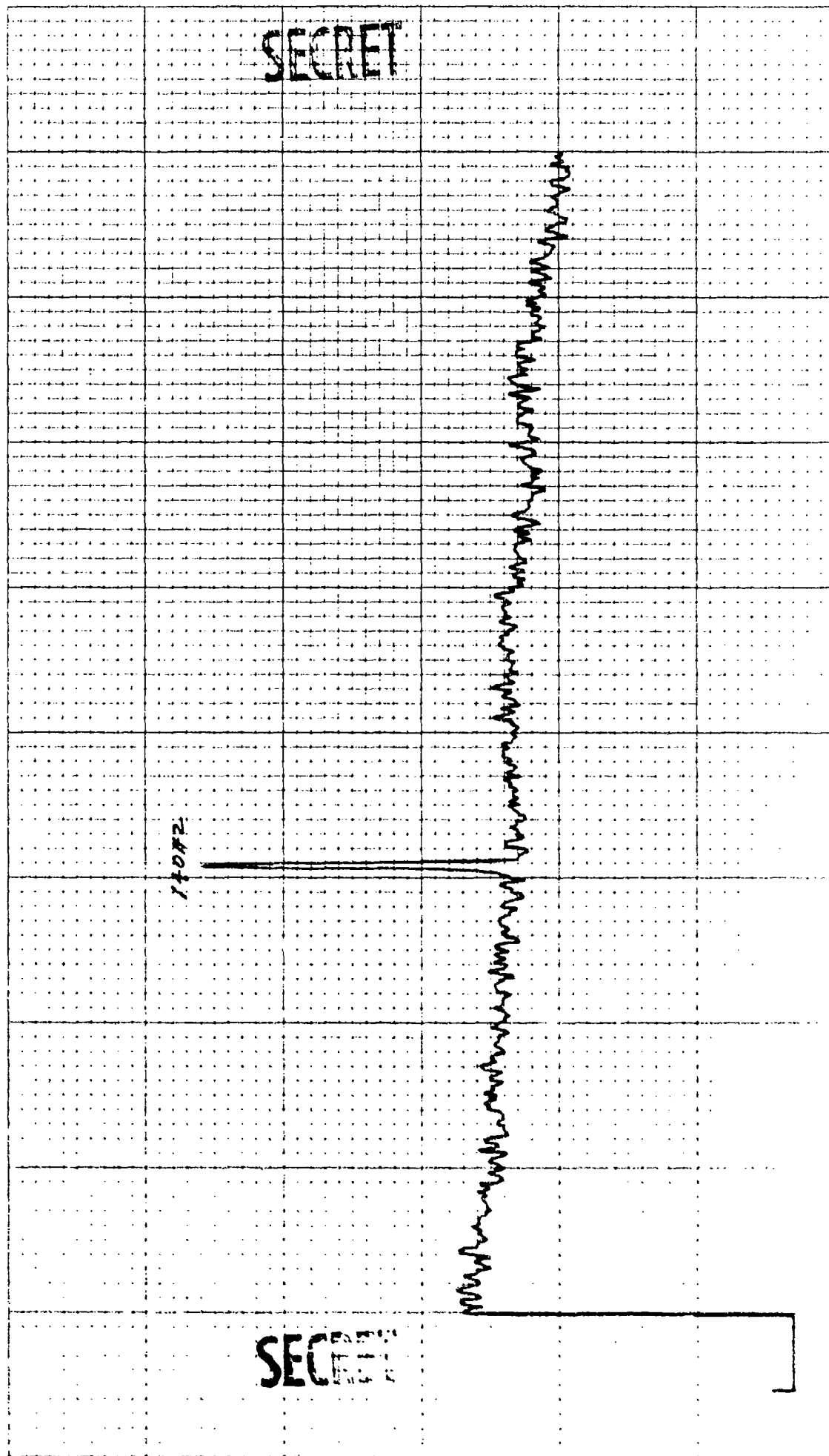
MRA SNR	<u>37.9</u>	<u>39.6</u>	<u>3.3</u>
MEAN OMNI SNR	<u>29.4</u>	<u>32.5</u>	<u> </u>
ARRAY GAIN	<u>8.5</u>	<u>7.1</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.7</u>	<u>17.1</u>	<u>17.2</u>
DIFFERENCE	<u>-6.2</u>	<u>-10.0</u>	<u> </u>

CONFIDENTIAL

REF ID: A60703

46 0703

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X 1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FIITFR WTG: HANNING
CENTER FREQ: 150 HZ -12 DEG. AZ STEERING



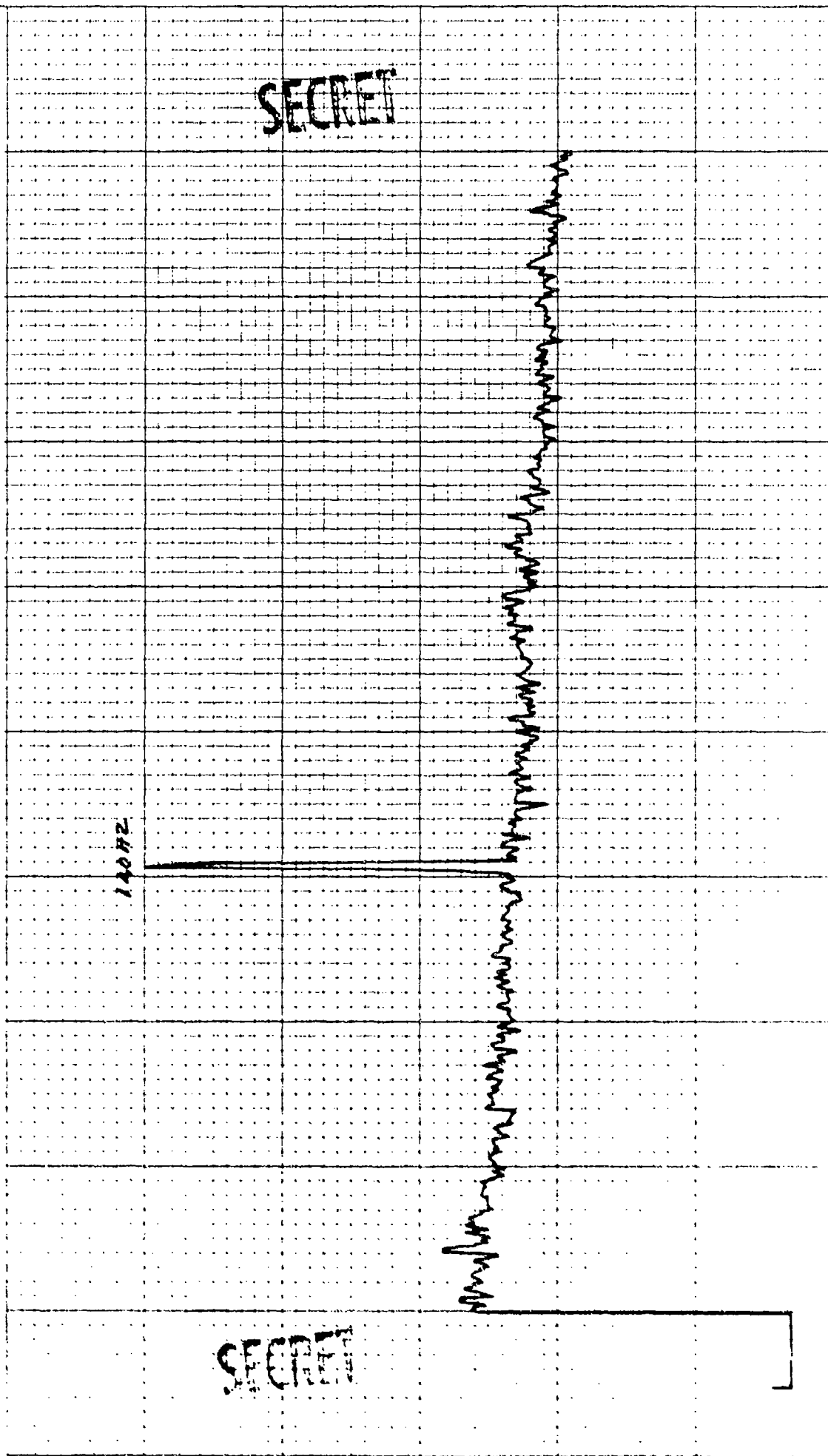
1-22 10:41 AM TO THE DIRECTOR, NSA

46 0703

CONTROL: 0202- 51 (DP7) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 0809-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS -14 DEG. AZ STEERING

REEL: F29 INTEGRATION TIME 320 SECS ATTEN: -30 DB
WTG: HANNING

INDEX 1145



REF ID: A60703

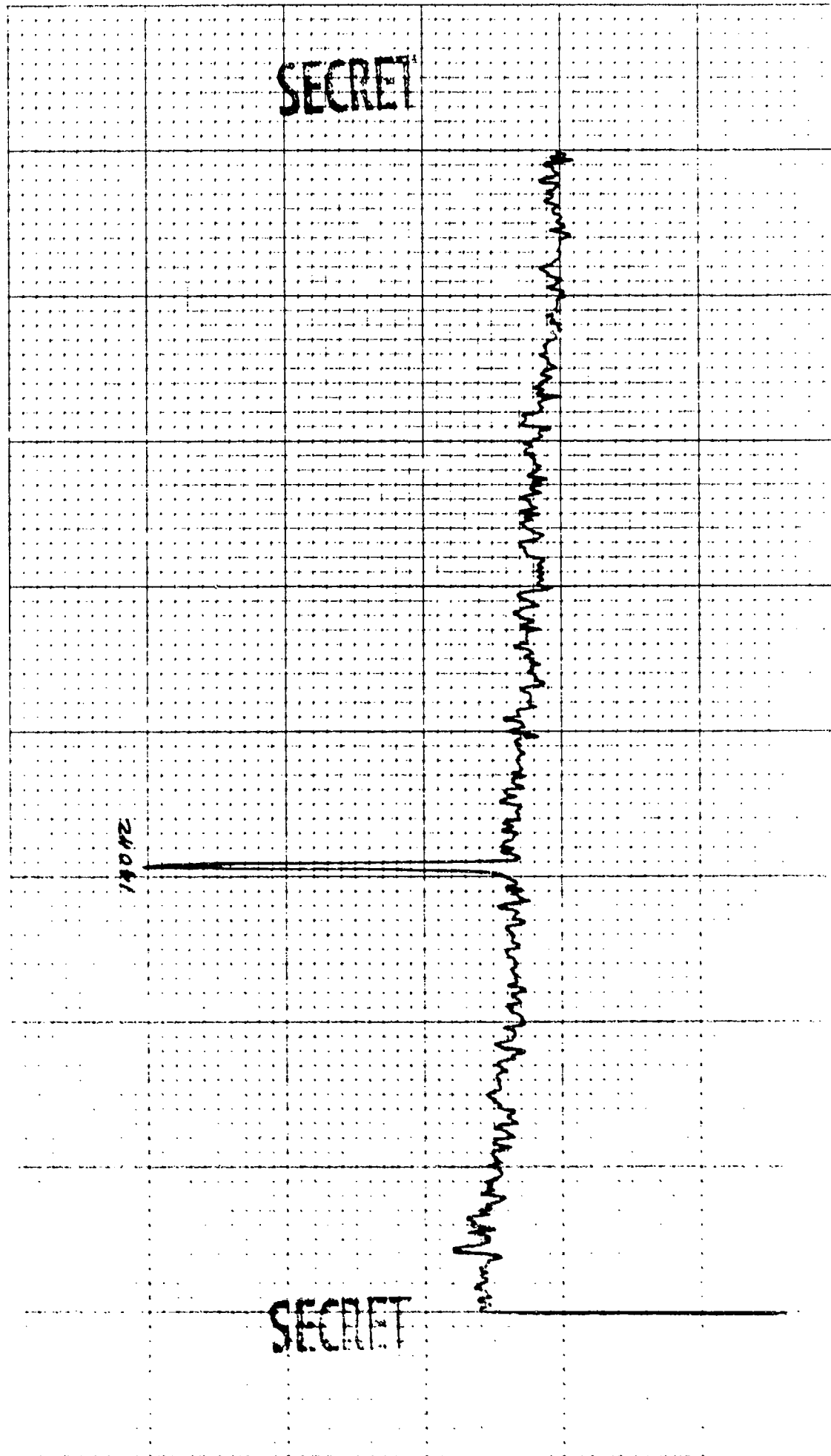
46 0703

CONTROL: 0202-51 (0207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-077-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-16 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTN: -20 DB
FILTFR WTG: HANNING

INDE X 1145

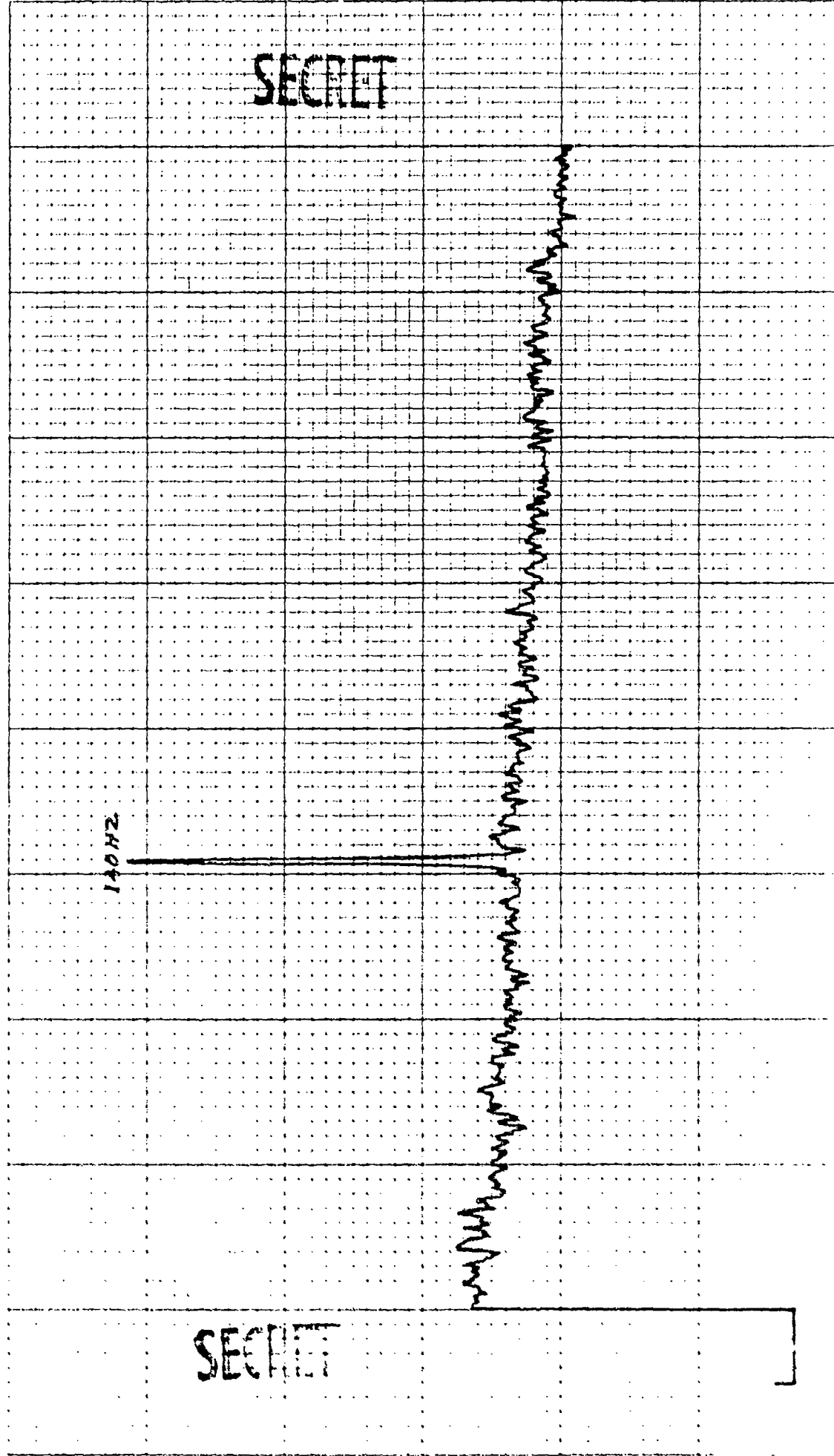


1-26-77 10:00 AM

46 0703

CONTROL: 0202-51 (DP1) DATE OF ANALYSIS: 1-26-77-0202Z REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77-0202Z
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS -10 DEC. AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: 30 DB
WTG: HANNING
FILTFR



46 0703

CONTROL: 0202-51 (DP7)

BEAMFORMED SPECTRUM(ELEMENTS

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

5/ ELEMENTS

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10HZ

-20 DEG. AZ STEERING

REEL: F29

INTEGRATION TIME 320 SECS

FILTER

WTG: HANNING

INDE X 1/45

ATTEN: -30 DB

WTC: HANNING

140 HZ

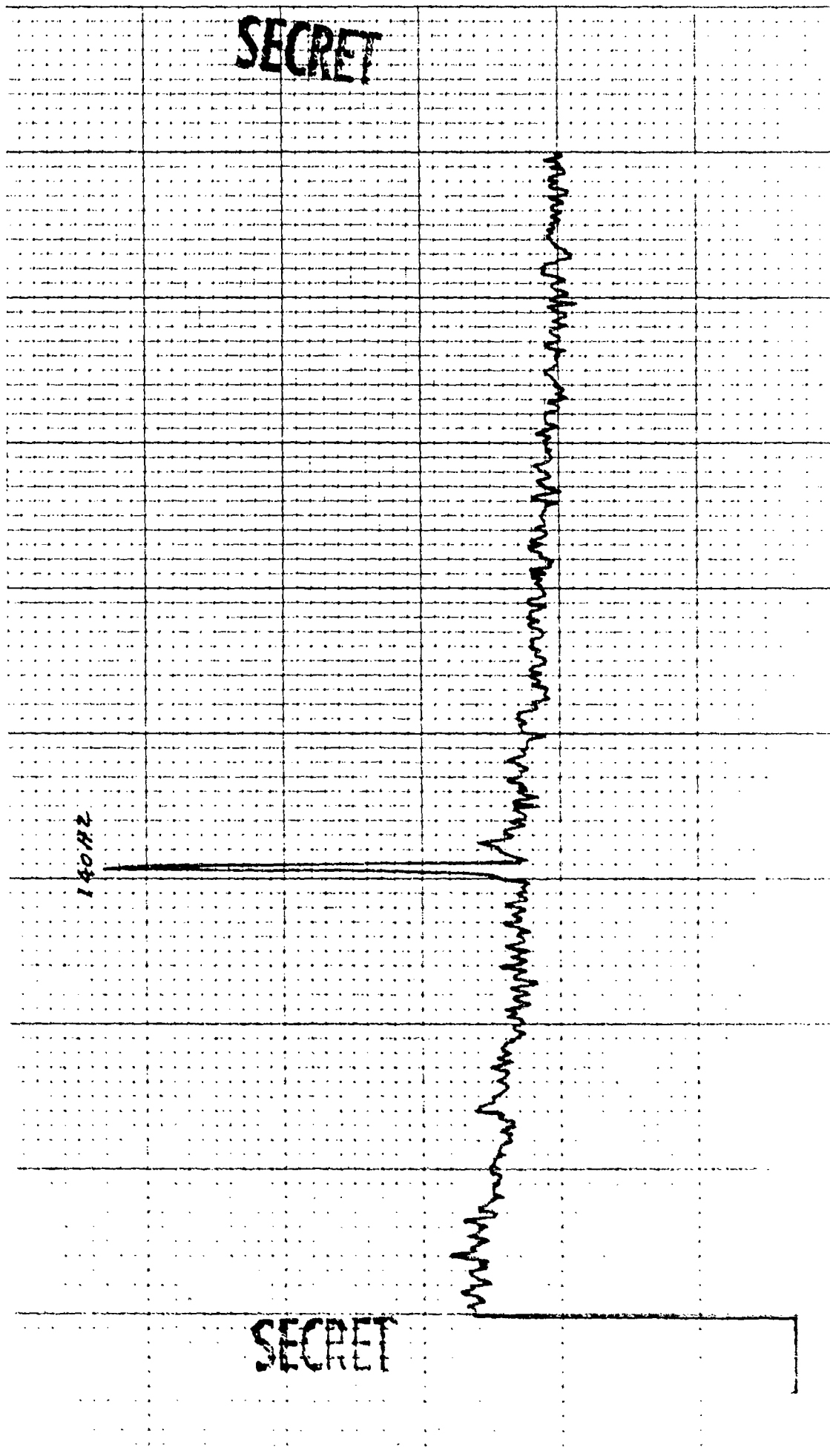
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1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100 4200 4300 4400 4500 4600 4700 4800 4900 5000 5100 5200 5300 5400 5500 5600 5700 5800 5900 6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000 7100 7200 7300 7400 7500 7600 7700 7800 7900 8000 8100 8200 8300 8400 8500 8600 8700 8800 8900 9000 9100 9200 9300 9400 9500 9600 9700 9800 9900 10000

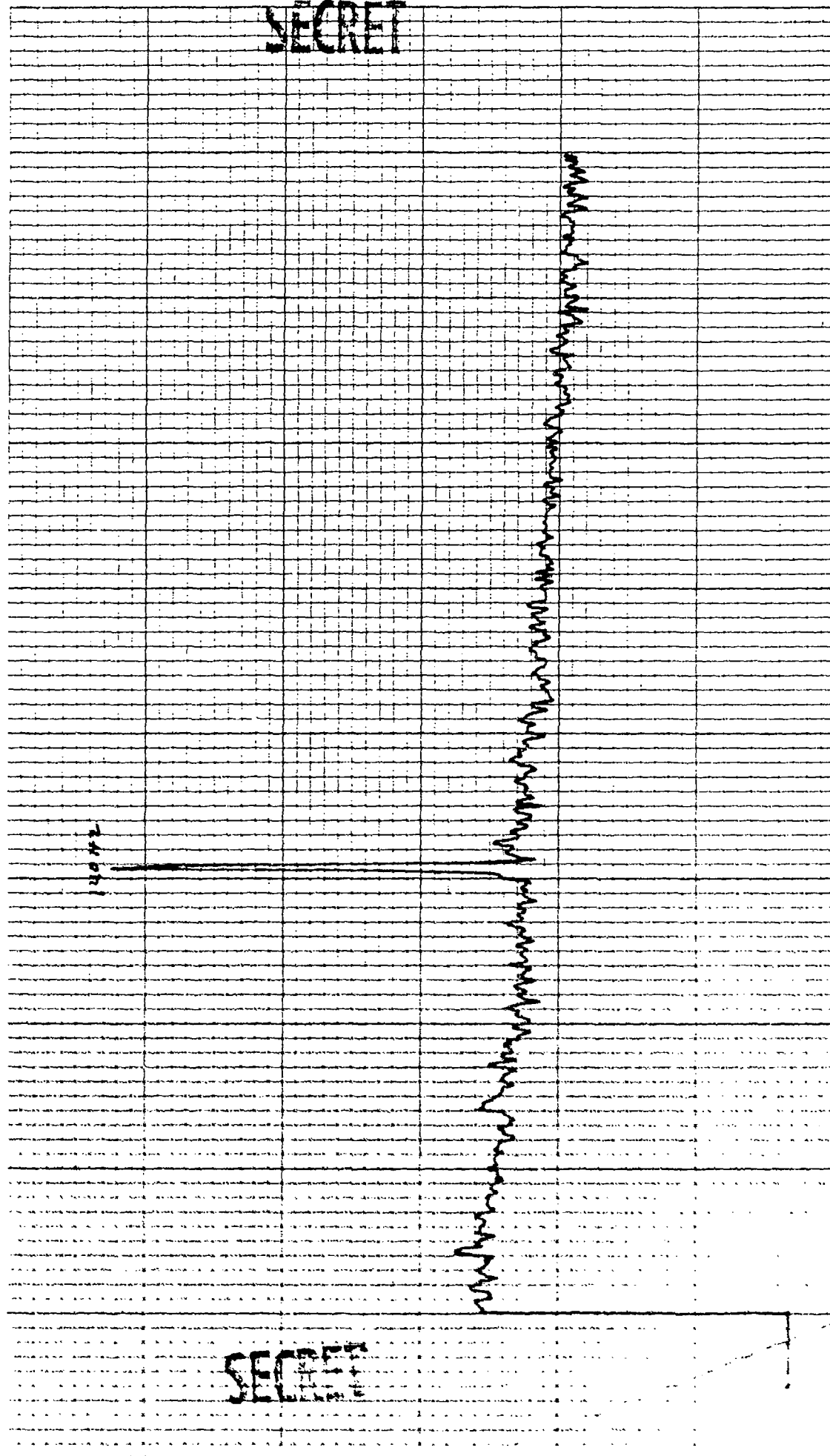
CONTROL: 0202-51 (DPT) DATE OF ANALYSIS: 1-26-53 REEL: 29 INDEX: 1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 0-0-77-0002Z INTEGRATION TIME 320 SECS ATTN: -30DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ - 2/ DEC. AZ STEERING



46 0703

DATE OF ANALYSIS: 1-26-53)
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 2Z DEG. AZ STEERING

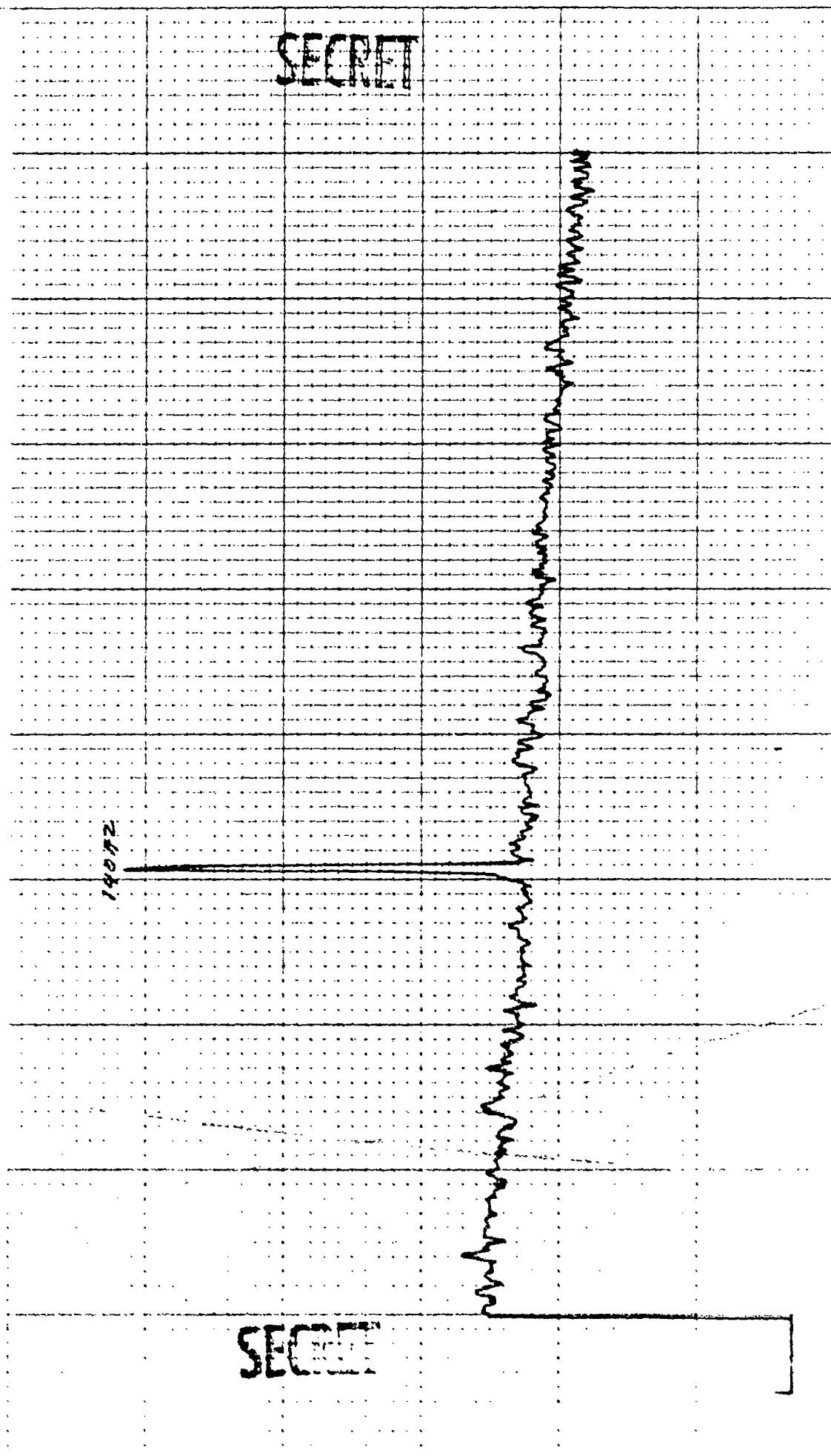
REEL: F29 INDEX: X1145
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTFR WTC: HANNING



1-26-53 1400Z 1400Z 1400Z 1400Z

46 0703

CONTROL: 0202-51 (007) DATE OF ANALYSIS: 1-26-53 REEL: 529 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-53
EXERCISE: BEARING STAKE DATE/TIME: 28-77-0202Z INTEGRATION TIME 320 SECS ATTN: 30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
51 ELEMENTS - 23 DEG. AZ STEERING



46 0703

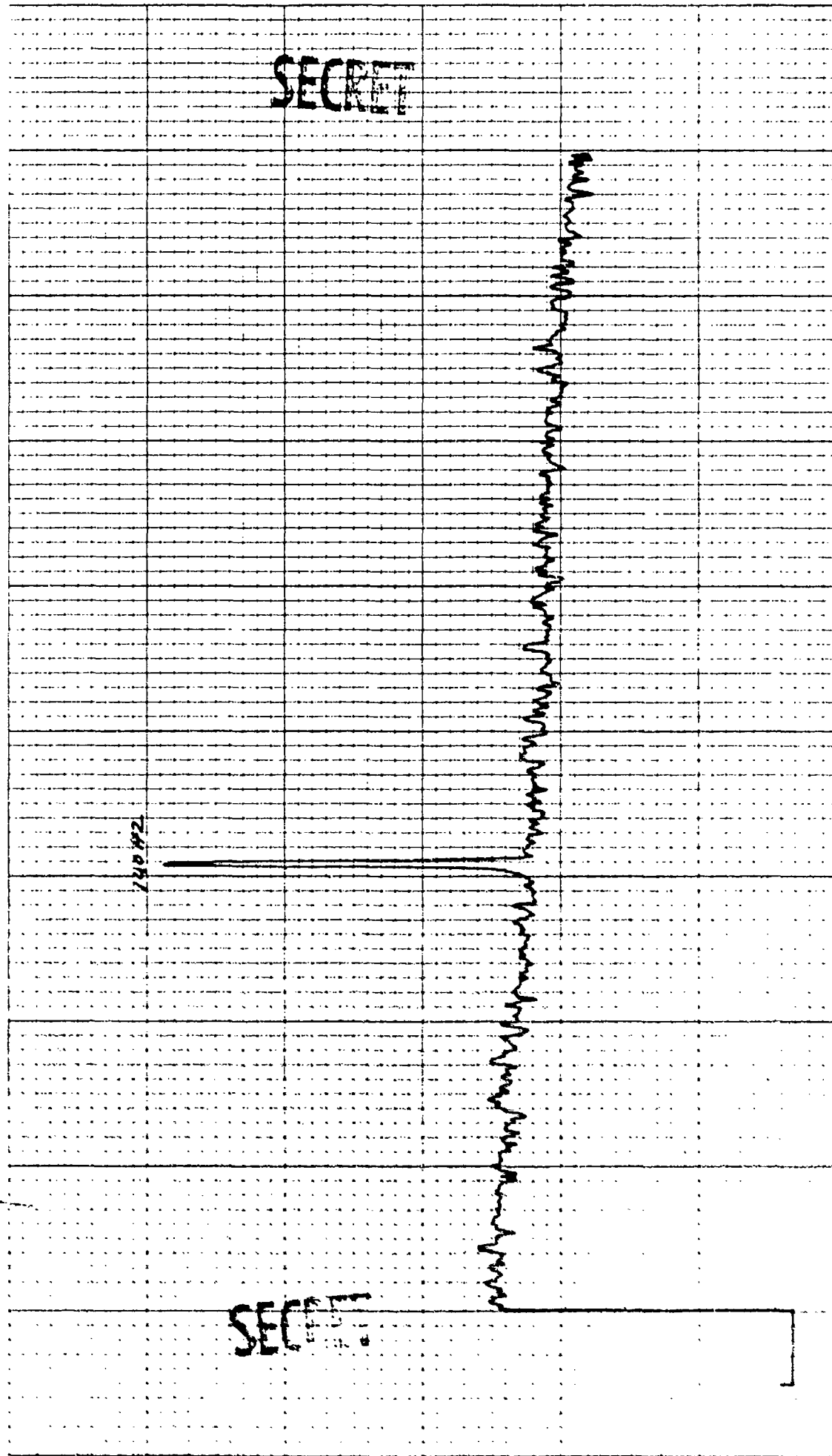
REF: 1-26 6 29-53

CONTROL: 0201-51 (007)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MHz
5/ ELEMENTS

DATE OF ANALYSIS: 1-26 6 29-53
DATE/TIME: 0-0-77 -0201Z
ANALYSIS BANDWIDTH: 1/10HZ
-24 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30DB
WTG: HANNING

INDE X 1/45



46 0703

1-26 10:00 AM 1942

CONTROL: 020 - 51 (207) DATE OF ANALYSIS: 1-26 1942 REEL: F29 INDE X1145
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 0-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTN: -30DB
CENTER FREQ: 150 MHz ANALYSIS BANDWIDTH: 17/10Hz FILTER WTC: HANNING
5/ ELEMENTS -26 DEC. AZ STEERING

SECRET

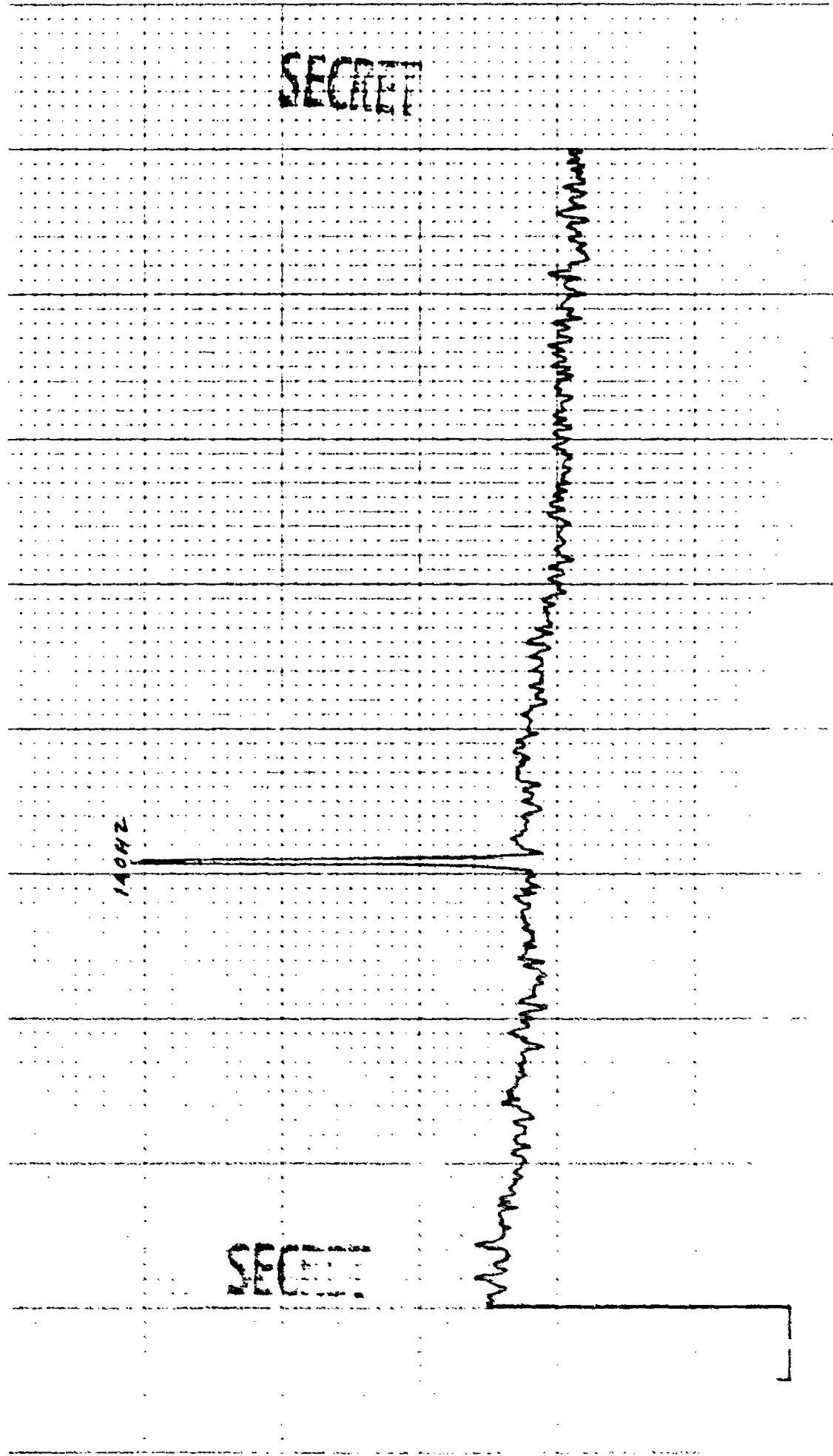
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19042

1-26 10:00 AM 1942

46 0703

CONTROL: 0202-51 (002) DATE OF ANALYSIS: 1-26-89-53 REEL: F-9 INDEX: X/145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ -26 DEG. AZ STEERING



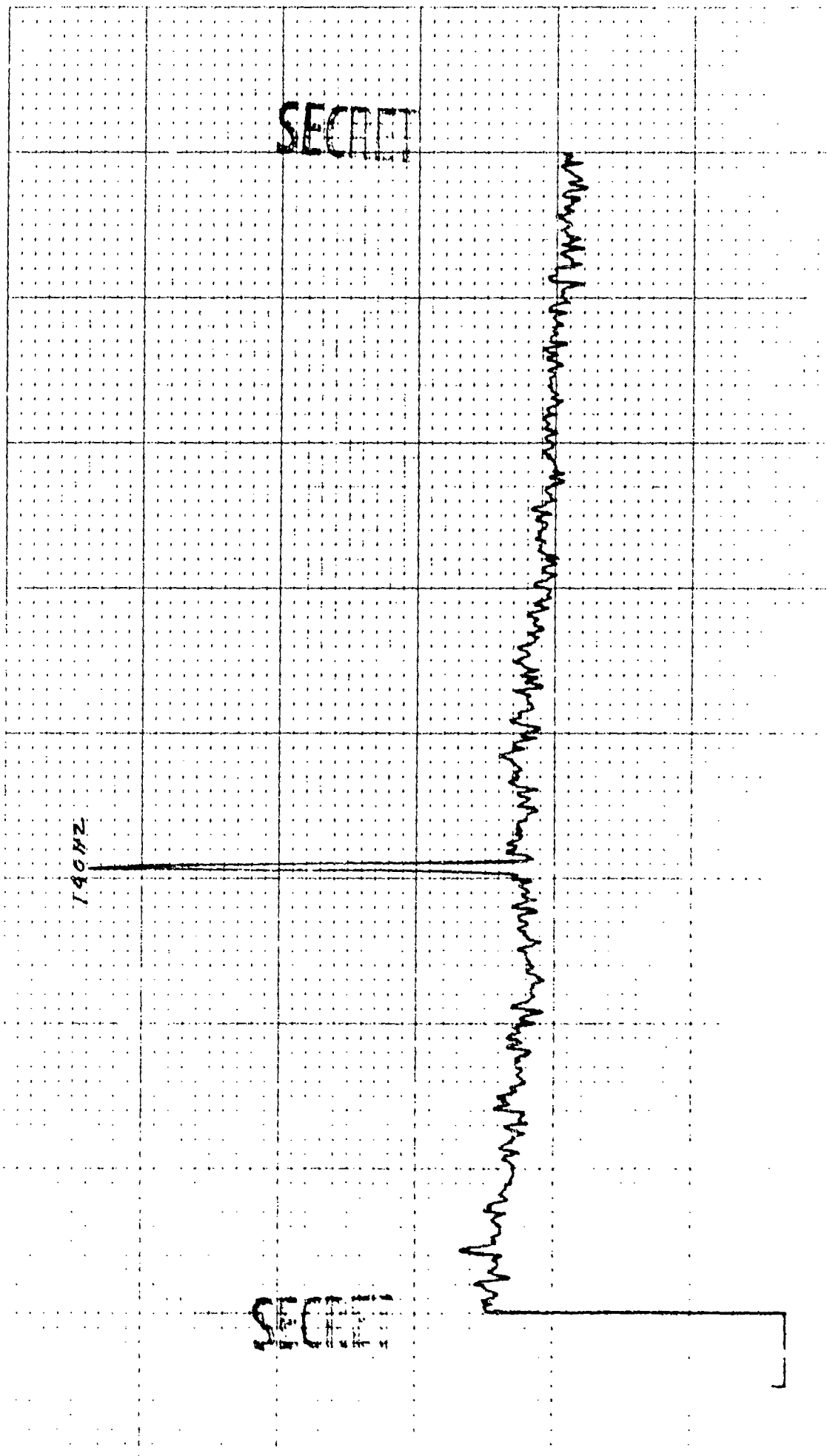
FILE 1111 1111 1111 1111

46 0703

CONTROL: 0202-51 (001)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

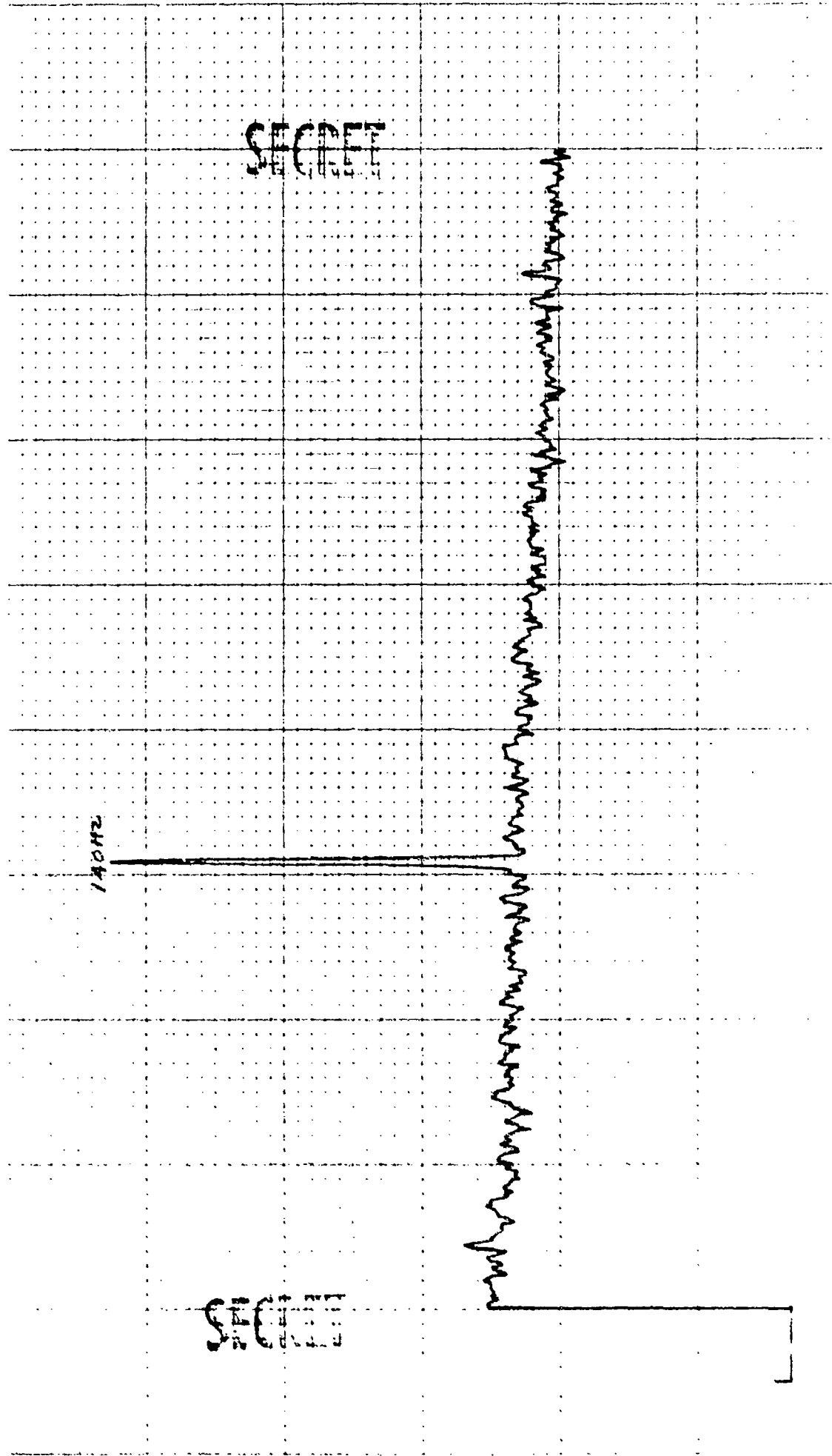
DATE OF ANALYSIS: 1-26-89-53
DATE/TIME: 0-0-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-30 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILTFF
ATTEN: -30 DB
WTG: HANNING



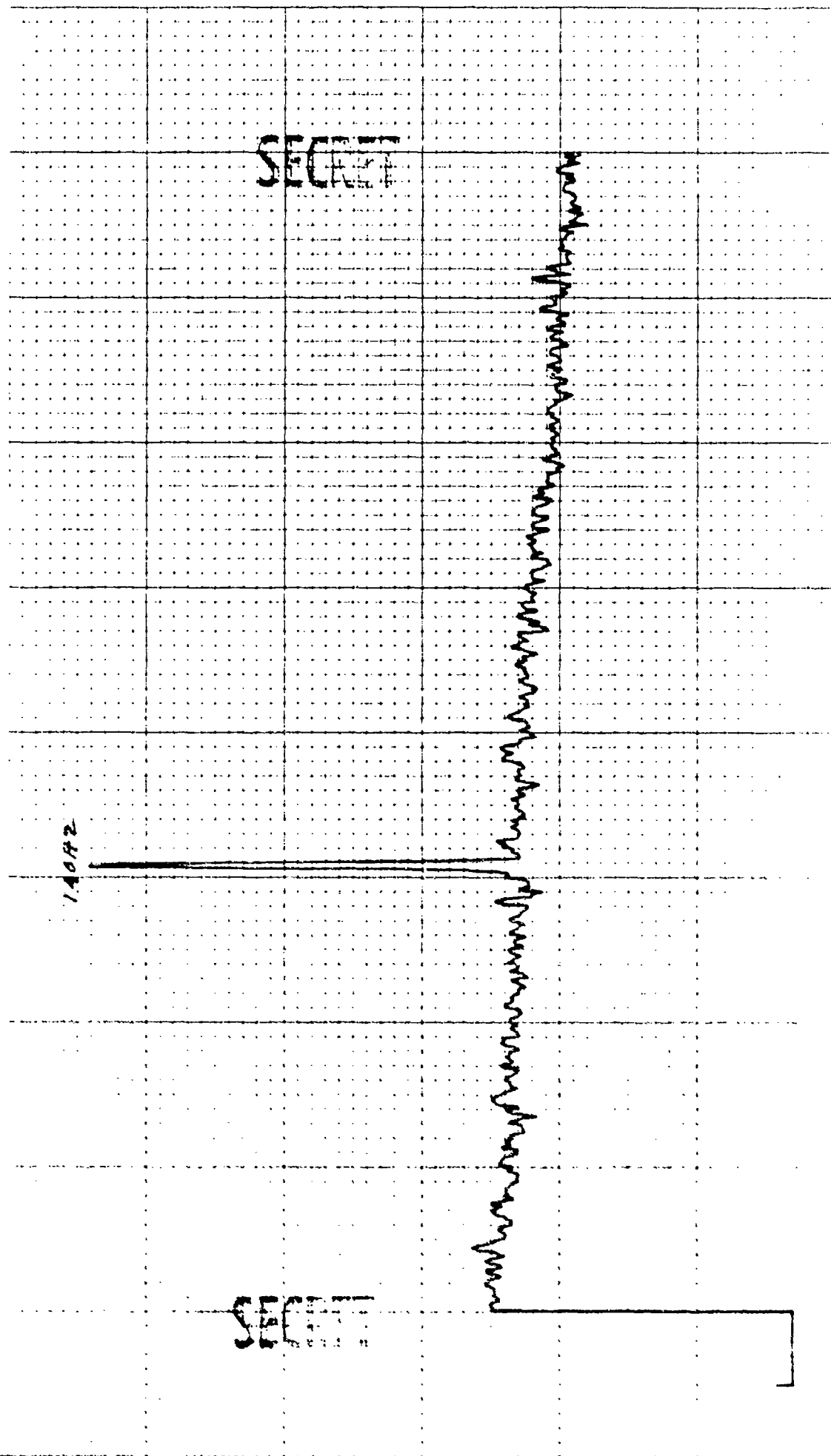
46 0703

CONTROL: 0202 - 51 (207) DATE OF ANALYSIS: 1-26-77 29-53)
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ - 32 DEG. AZ STEERING
51 ELEMENTS
REEL: F29 INTEGRATION TIME 320 SECS ATTEN: -30DB
INDE X/145 WTG: HANNING



46 0703

CONTROL: 0202 - 51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X1145
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE FILTER WIG: HANNING
CENTER FREQ: 150 HZ
51 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
-74 DEG. AZ STEERING



1994

CONTROL: 0202 - 51 (017) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDEX X 1145
BEAMFORMED SPECTRUM(ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ -36 DEG. AZ STEERING
51 ELEMENTS

SECRET

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46 0703

INDE X 1145

REEL: F29

ATTEN: -70 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 2-8-77 -0002Z

ANALYSIS BANDWIDTH: 1/10HZ

-30 DEG. AZ STEERING

CONTROL: Q202-51 (297)

BEAMFORMED SPECTRUM (ELEMENTS

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

51 ELEMENTS

140HZ

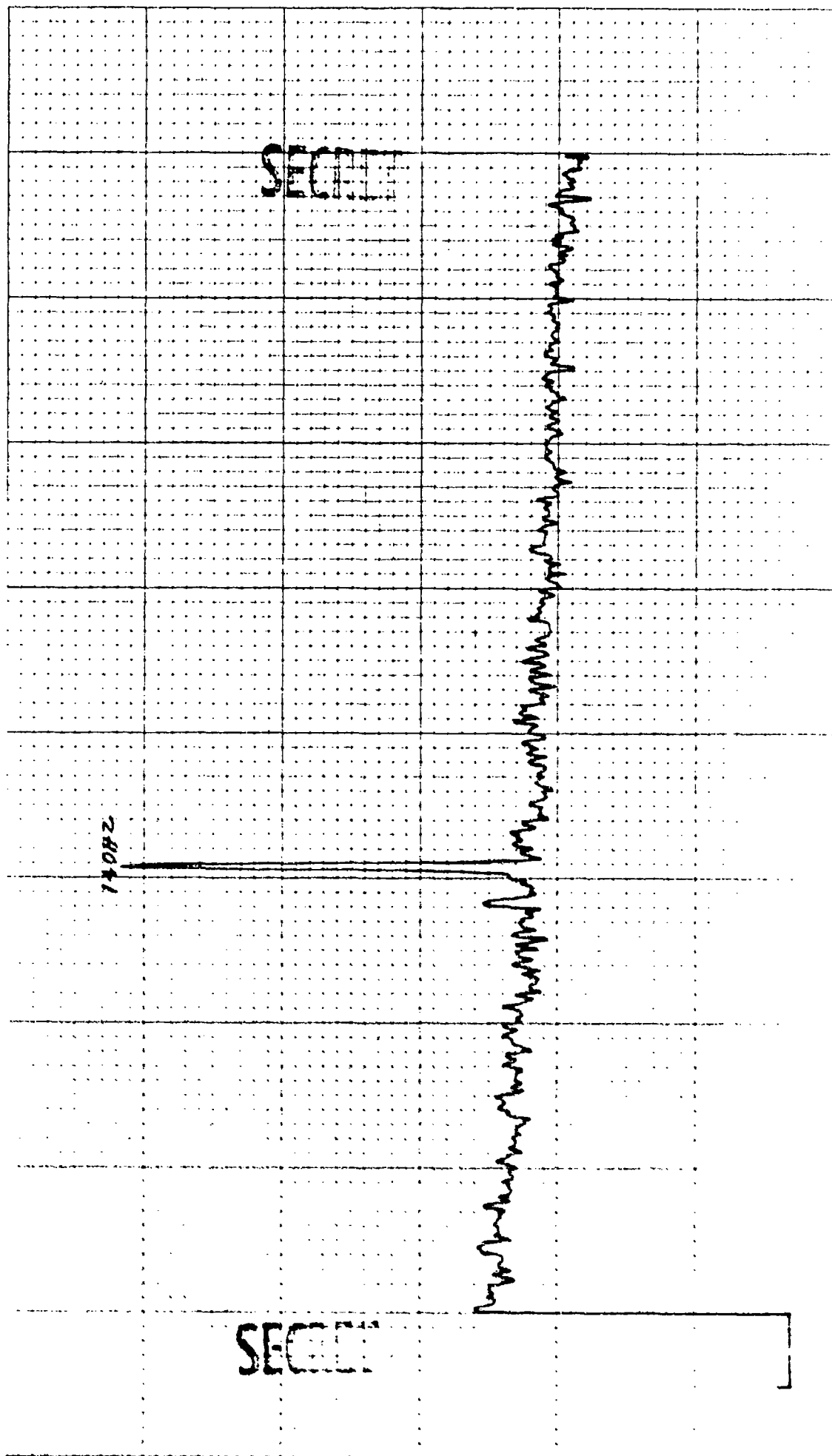
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SECRET

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46 0703

CONTROL: 0202-51 (D07) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDEX: X1145
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-53 INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z FILTFR: WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS -40 DEG. AZ STEERING



46 0703

1-26 9 08-53

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26 9 08-53 REEL: F29 INDE X 1145
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ - 42 DEG. AZ STEERING

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info. from 1-26 9 08-53 to 2-8-77 - 0202Z

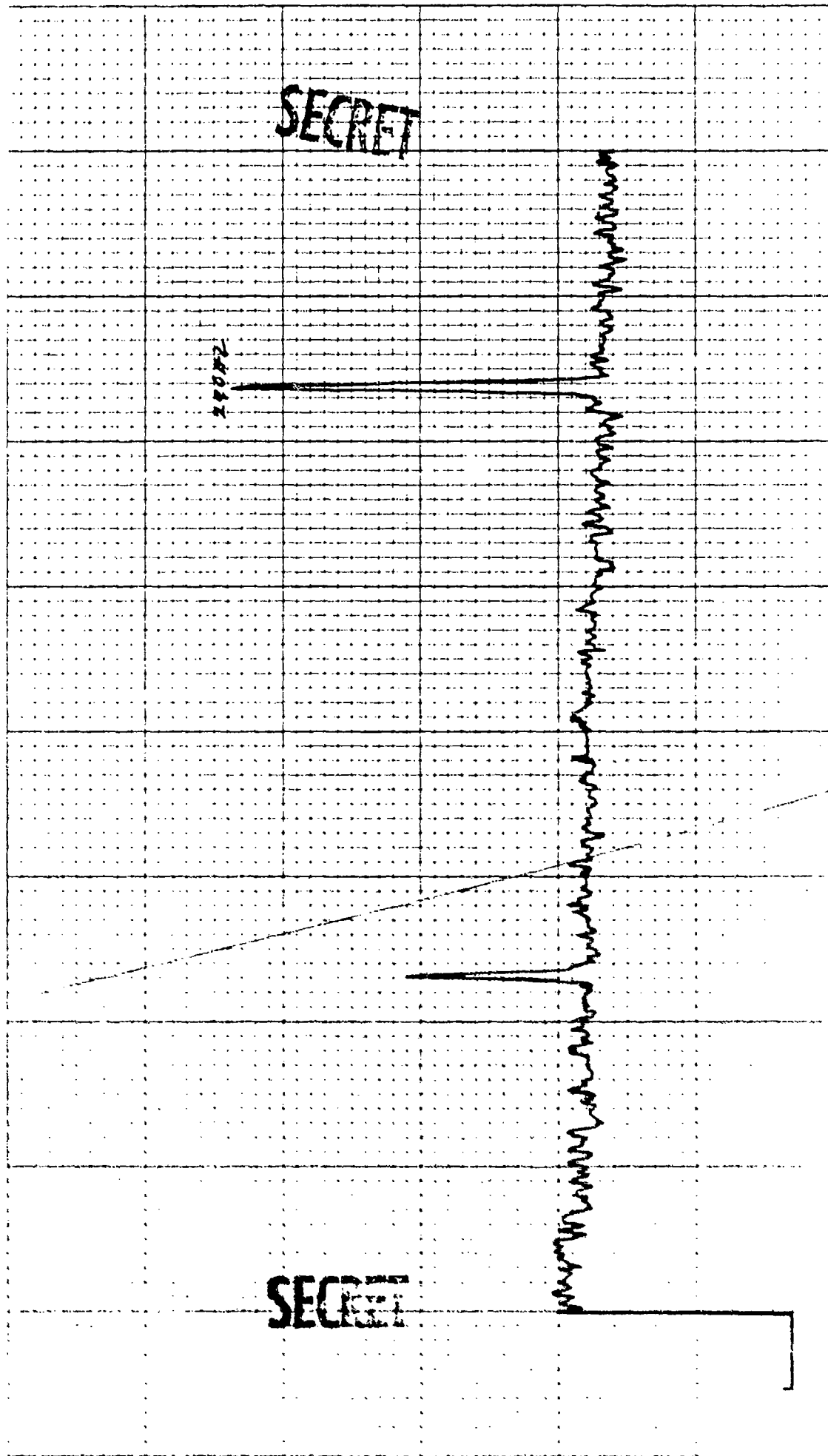
46 0703

CONTROL: 0202-5/ (0207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-82
DATE/TIME: 20:00-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-12 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

INDE X/145
ATTEN: -30 DB



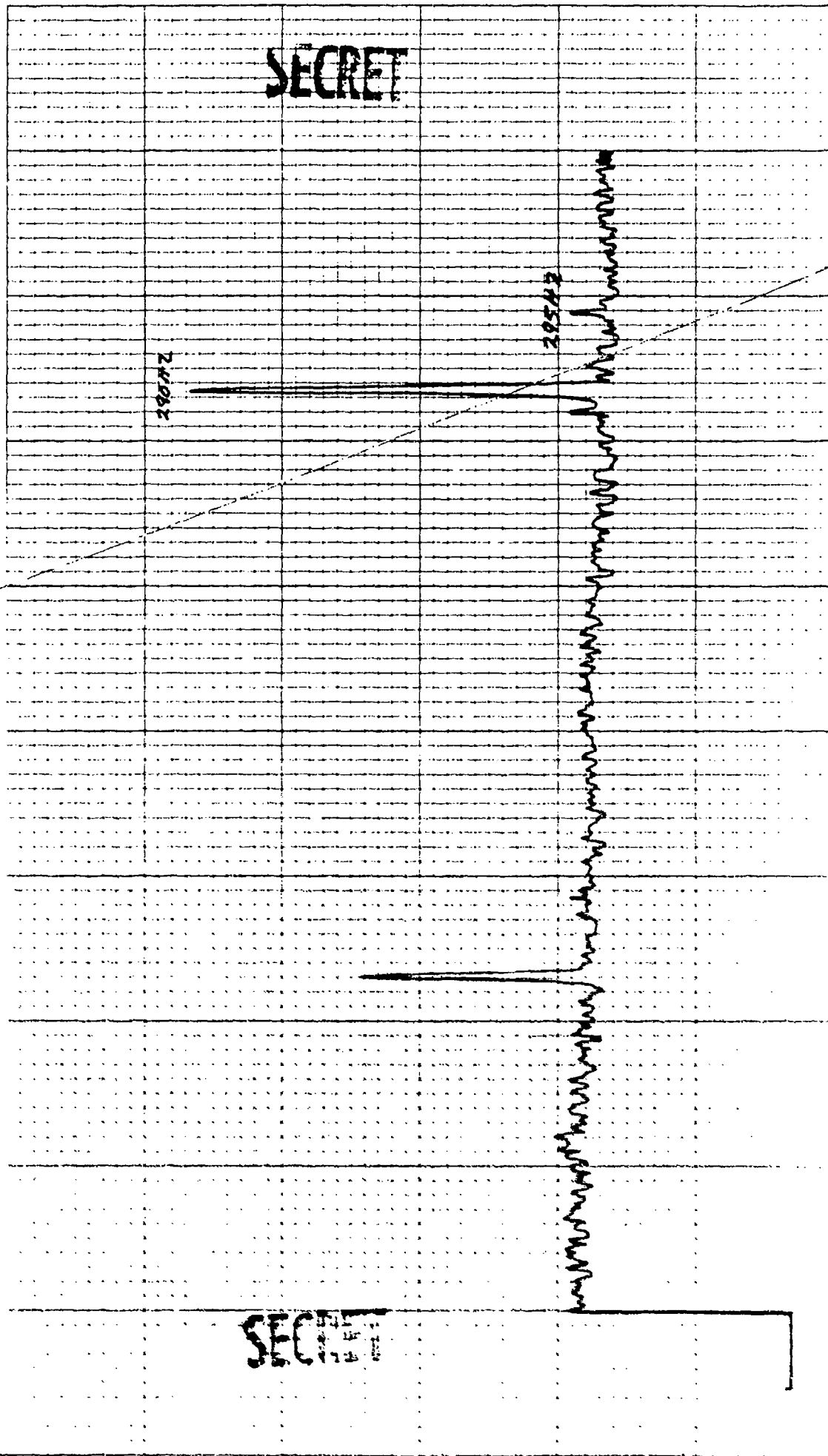
1-2-53 10:45 TO THE BUREAU OF THE ARMY

46 0703

CONTROL: 0202 - 51 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 1800 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-14 DEG. AZ STEERING

REEL: F39
INDE X1145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING



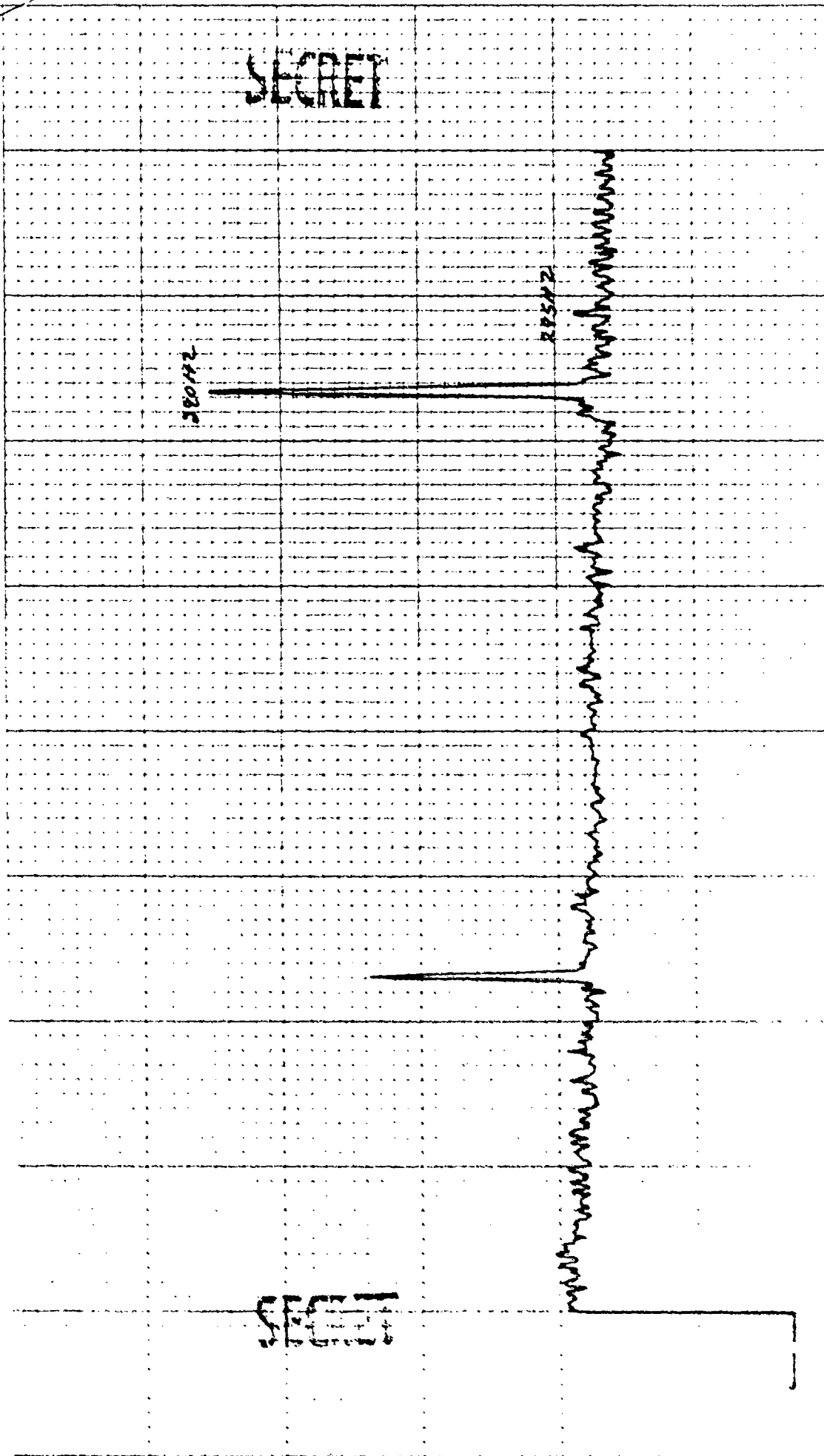
46 0703

USE 2000 0000 0000 0000

CONTROL: 0302-51 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-88 08-53
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-1/6 DEG. AZ STEERING

REEL: F09 INDE X/45
INTEGRATION TIME 320 SECS
ATTEN: -20 DB
FILTER WTC: HANNING



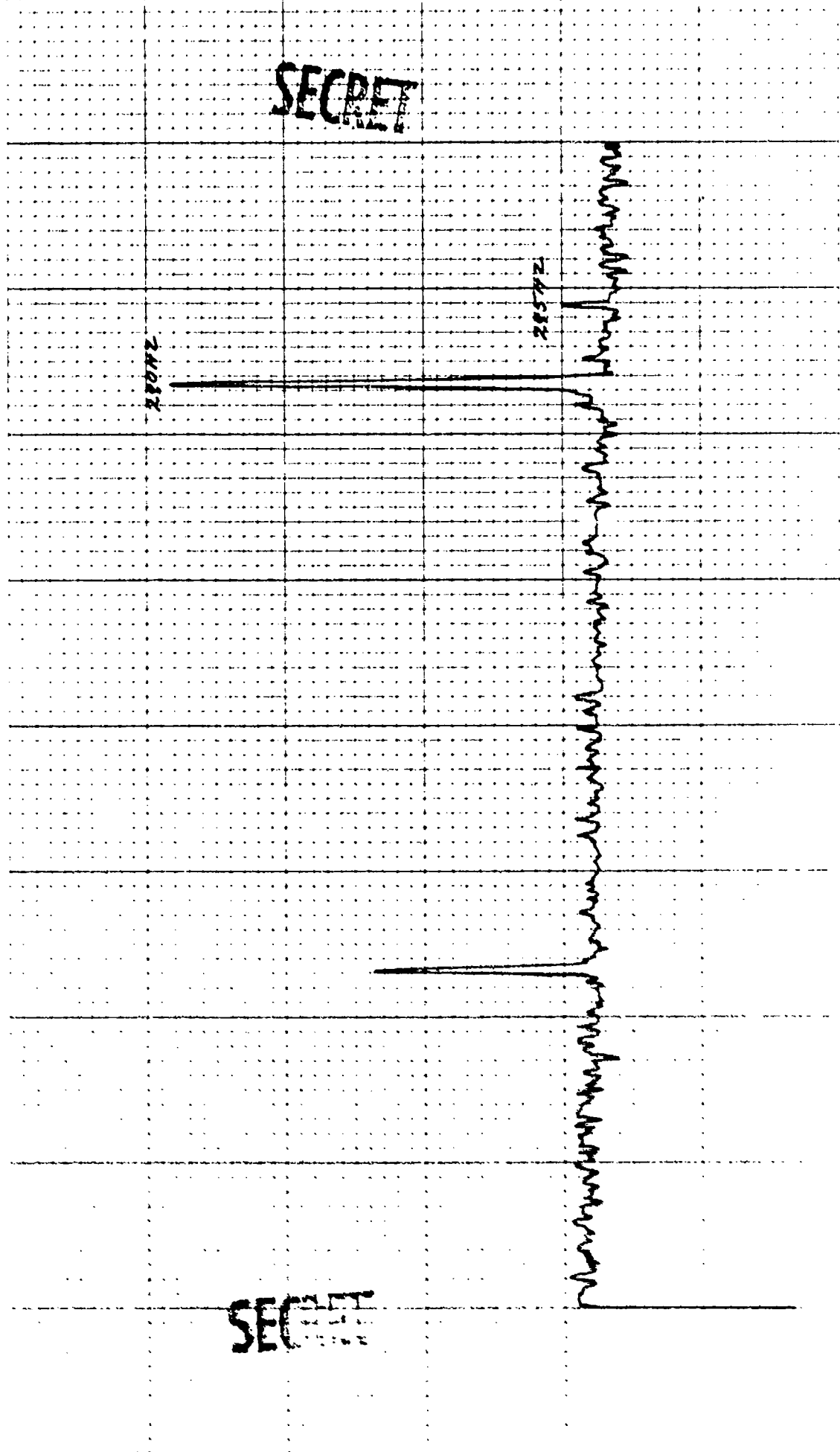
46 0703

CONTROL: 0202-5/ (207)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 MZ
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 20-27-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-10 DEG. AZ STEERING

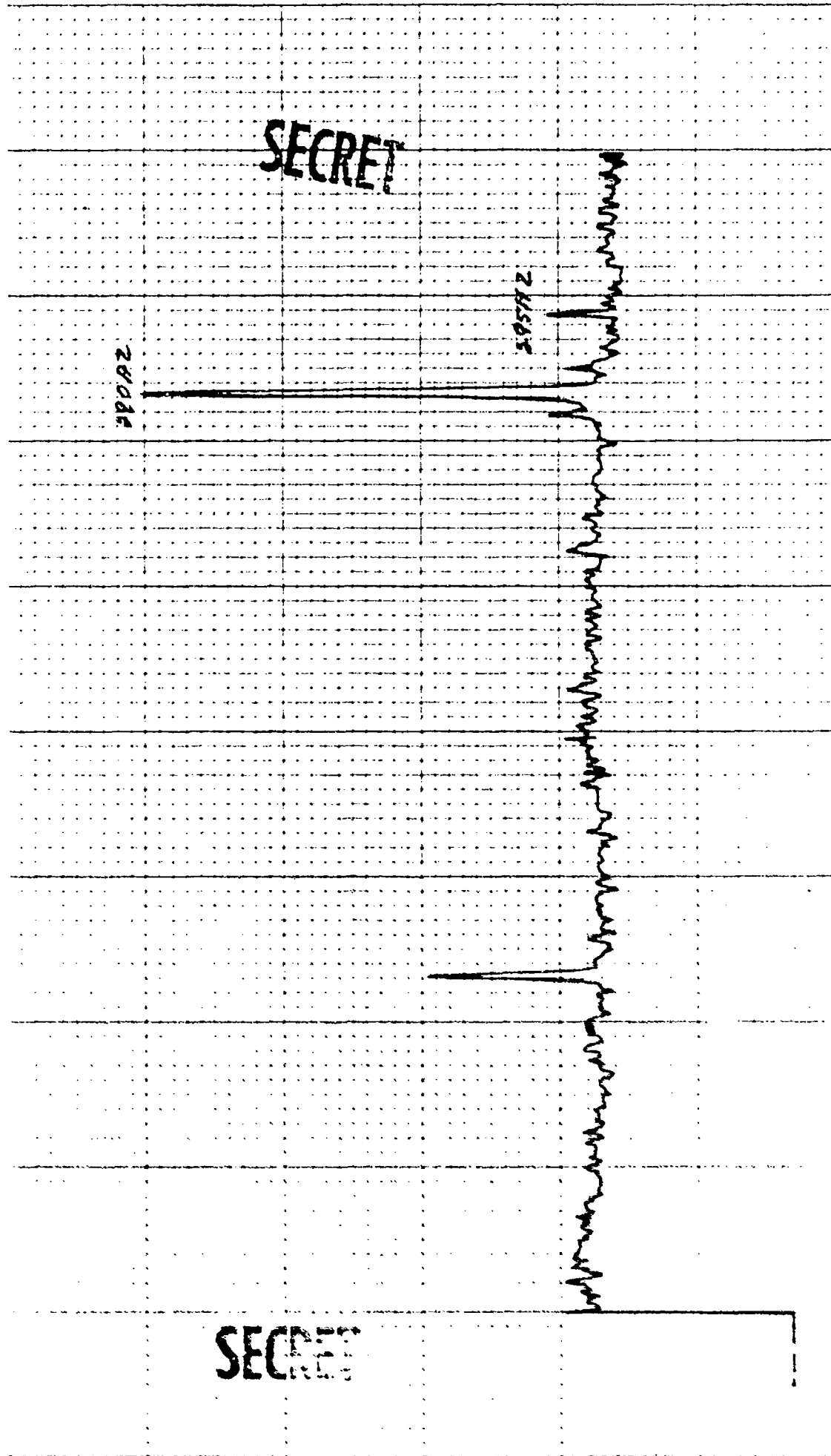
REEL: F29
INTEGRATION TIME 320 SECS
FILTR WTG: HANNING

INDE X//45



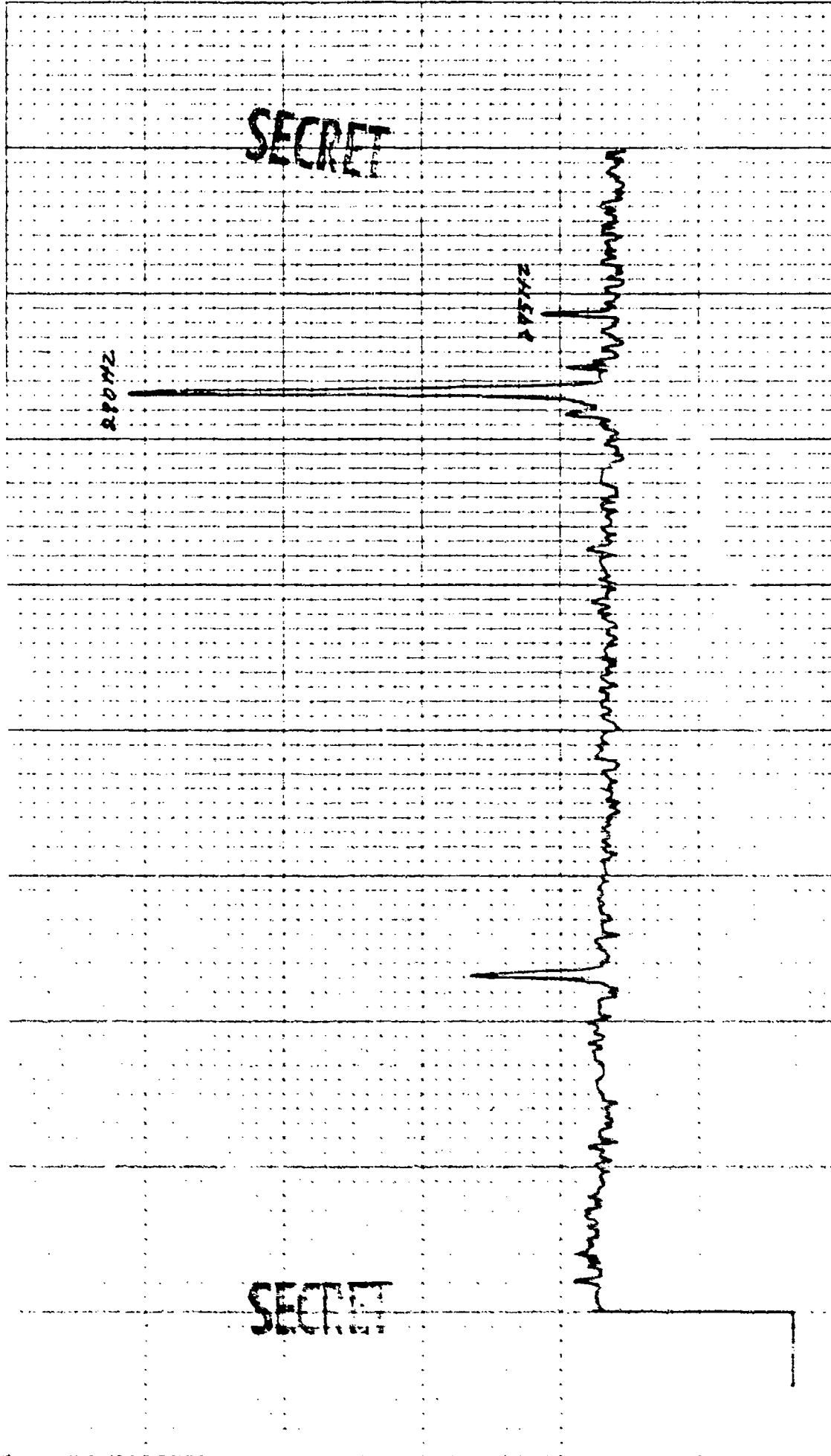
46 0703

CONTROL: 0302 - 51 (007) DATE OF ANALYSIS: - - - REEL: F29 INDE X 1195
BEAMFORMED SPECTRUM(ELEMENTS) 1-264 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0302Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
51 ELEMENTS - 20 DEG. AZ STEERING



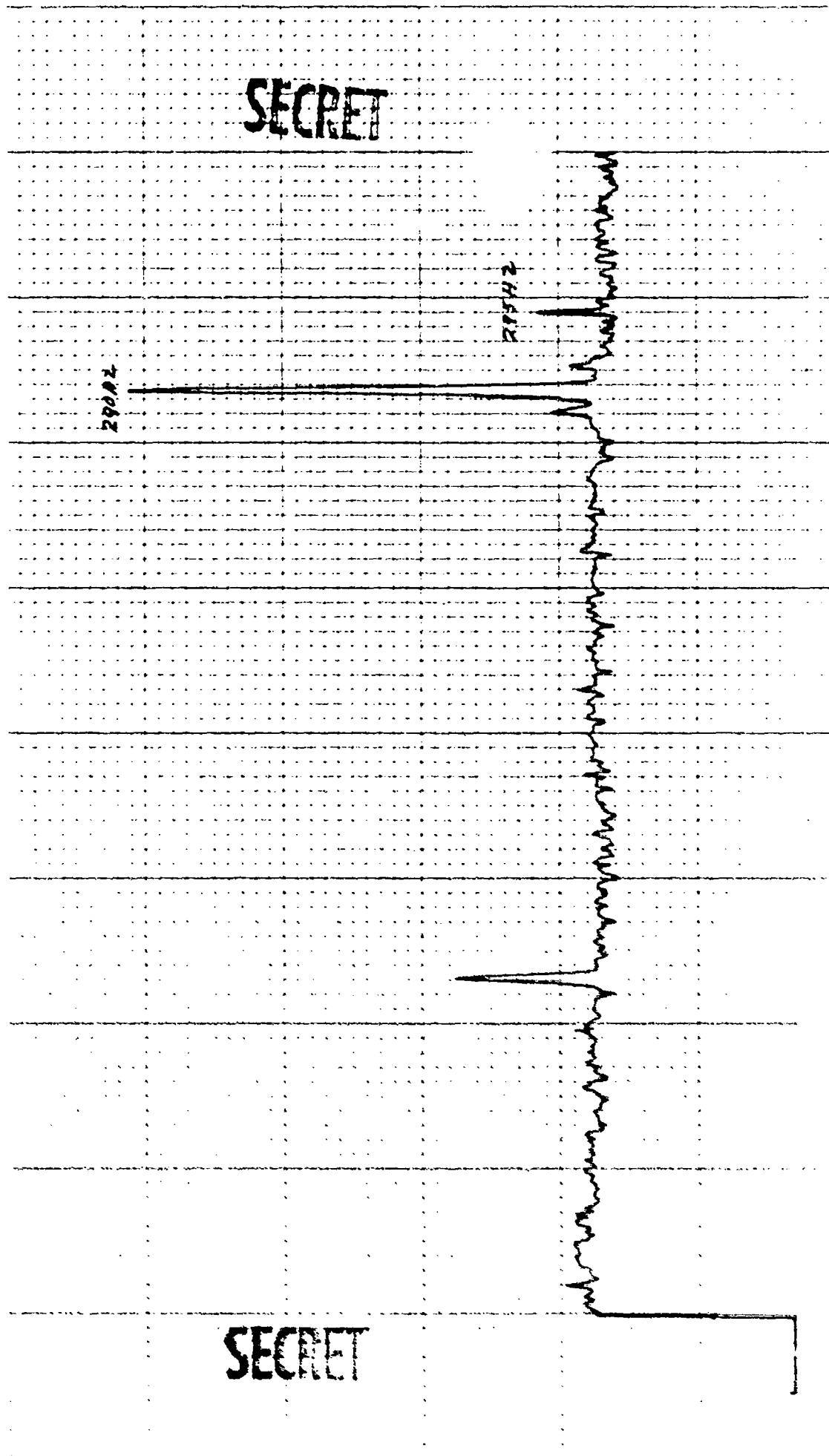
46 0703

CONTROL: 0202-51 (2027) DATE OF ANALYSIS: 1-26-89-53 REEL: F39 INDEX: X1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 290 HZ - 22 DEG. AZ STEERING



46 0703

CONTROL: 0202 - 5/ (027) DATE OF ANALYSIS: 1-20-53 INDEX X 11045
BEAMFORMED SPECTRUM(ELEMENTS) 1-20-53 REEL: F29
EXERCISE: BEARING STAKE DATE/TIME: 2027 - 0202Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
5/ ELEMENTS -21 DEG. AZ STEERING



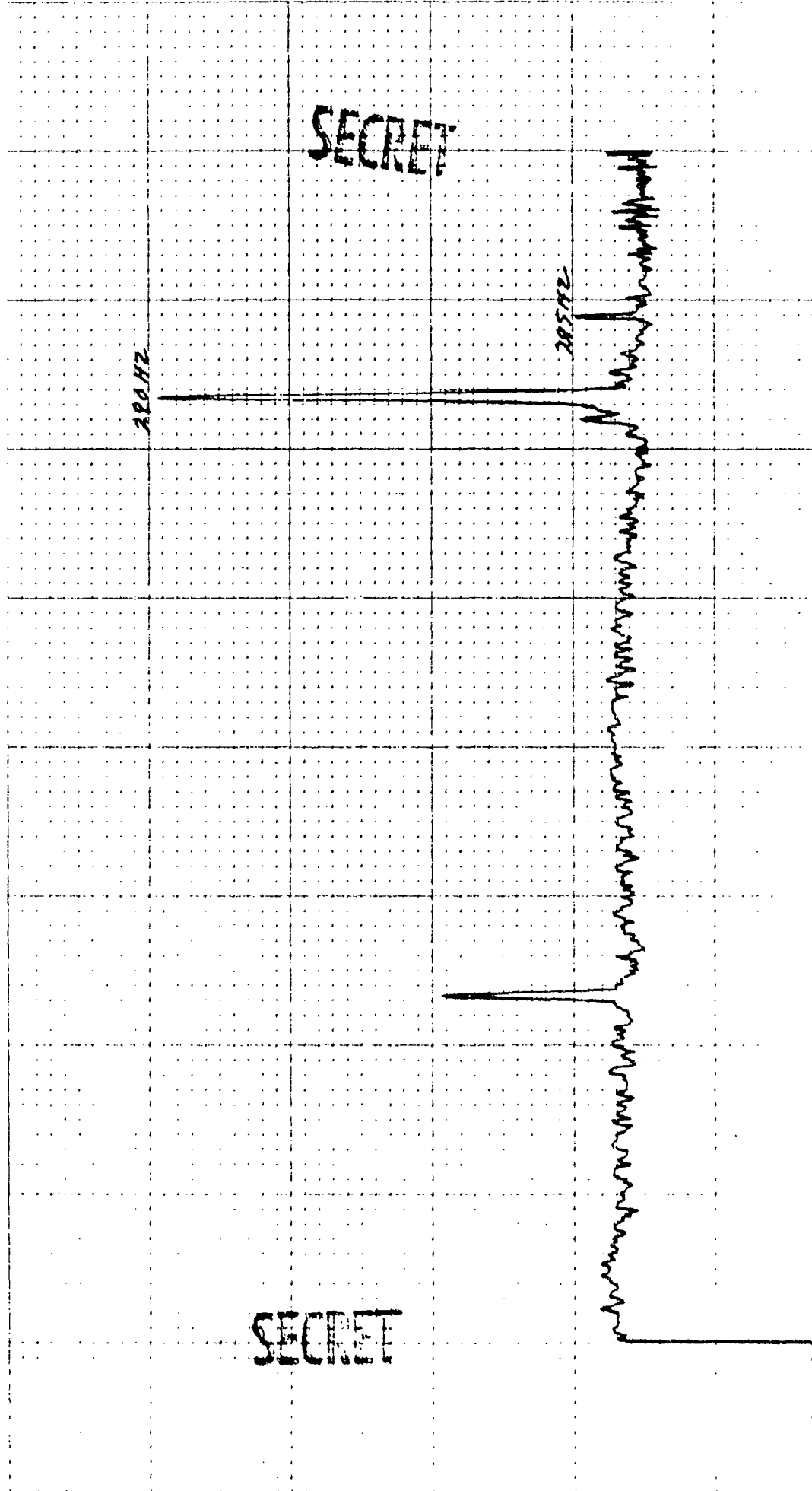
46 0703

CONTROL: 0202 - 51 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: 3 BEARING STAKE
CENTER FREQ: 280 HZ
5/ ELEMENTS

DATE OF ANALYSIS: - - -
1-26-53
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
- 04 DEG. AZ STEERING

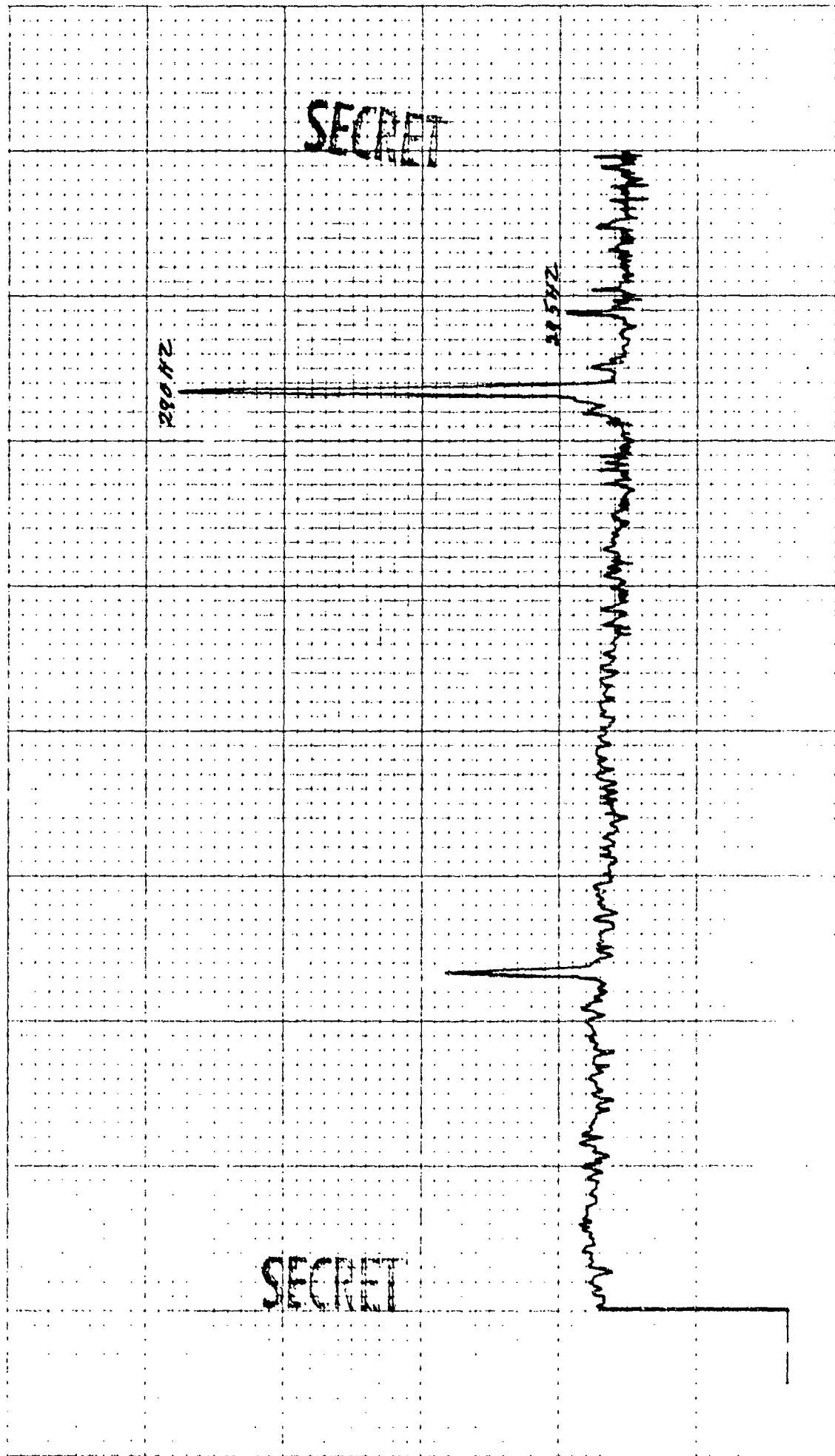
REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: ~30 DB
FILTER
WTG: HANNING

INDE X 1145



46 0703

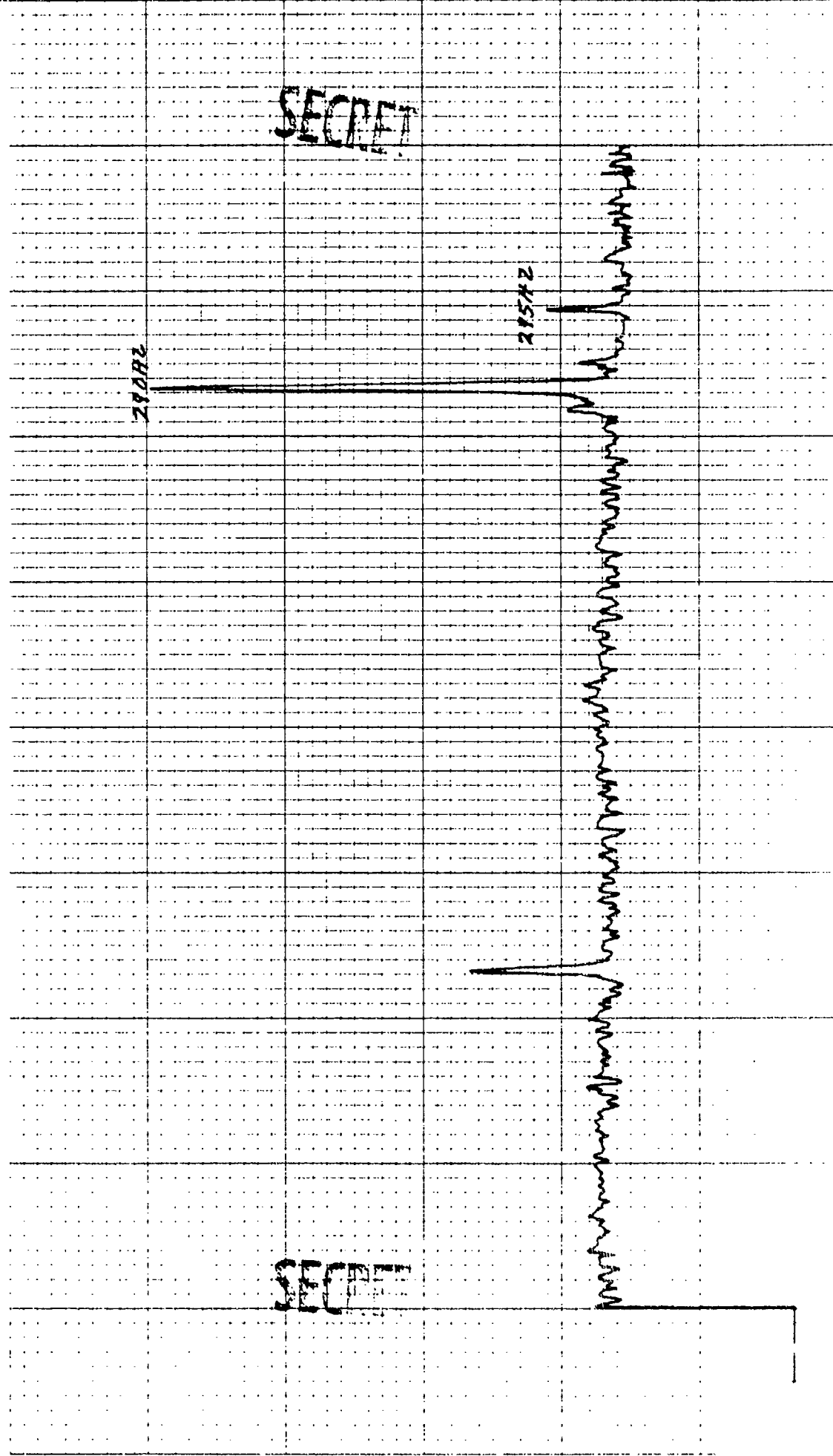
CONTROL: 0002 - 51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F30 INDEX: X1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ -26 DEG. AZ STEERING



K-5 10 X 10 TO THE INCH • 7 X 10 INCHES
REUNITED A PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: 0200 - 51 (207) DATE OF ANALYSIS: 1-26-53 REEL: F21 INDEX: X1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FTI: TFR WTG: HANNING
CENTER FREQ: 200 HZ -20 DEG. AZ STEERING



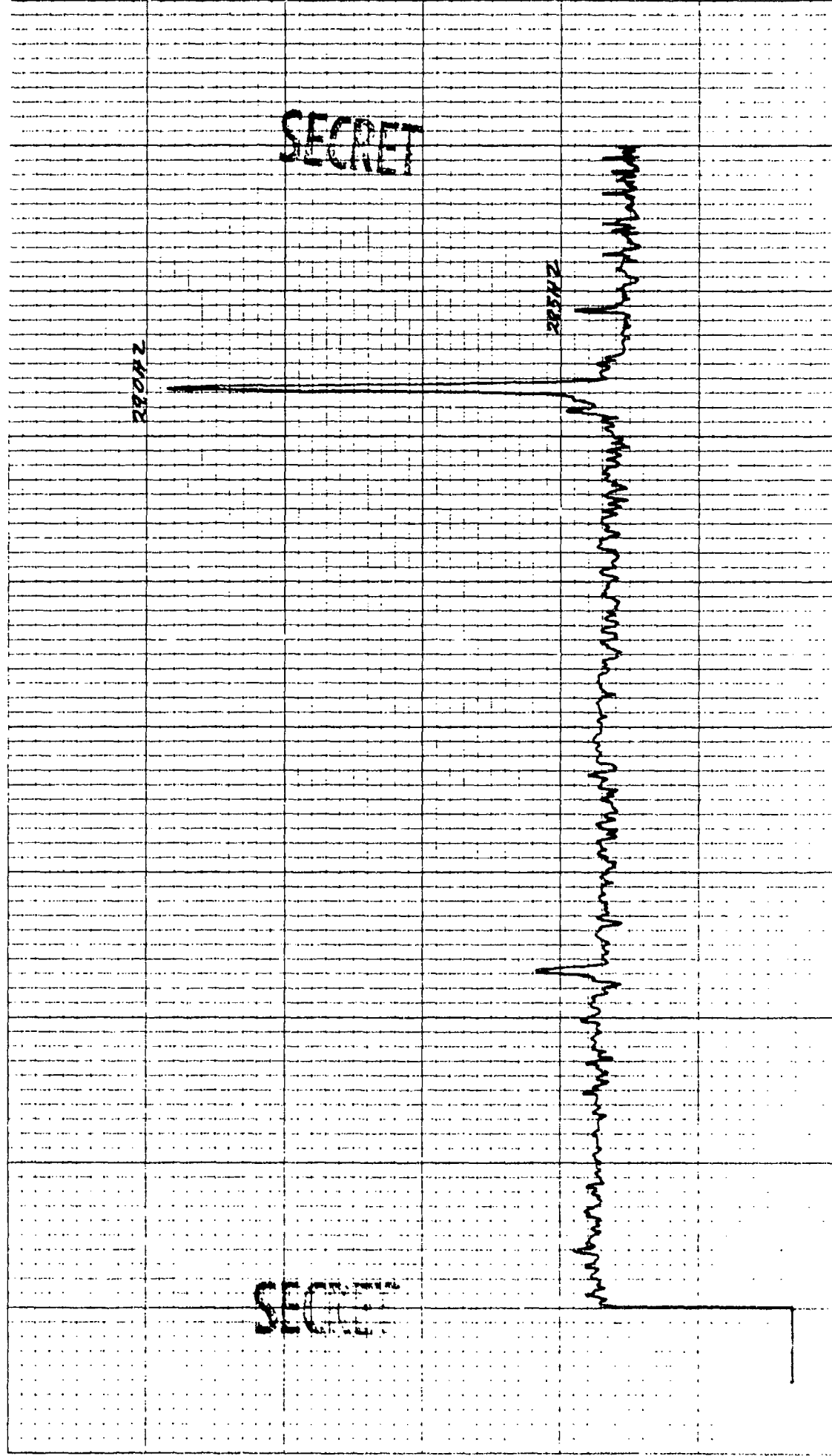
1402 10 X 10 TO THE INCHES 1 X 10 INCHES
PETER H. WENTZ CO. BALTIMORE, MD.

46 0703

CONTROL: 0202 - 51 (DPT) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 26 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
5/ ELEMENTS - 30 DEG. AZ STEERING

REEL: F29 INDE X/145

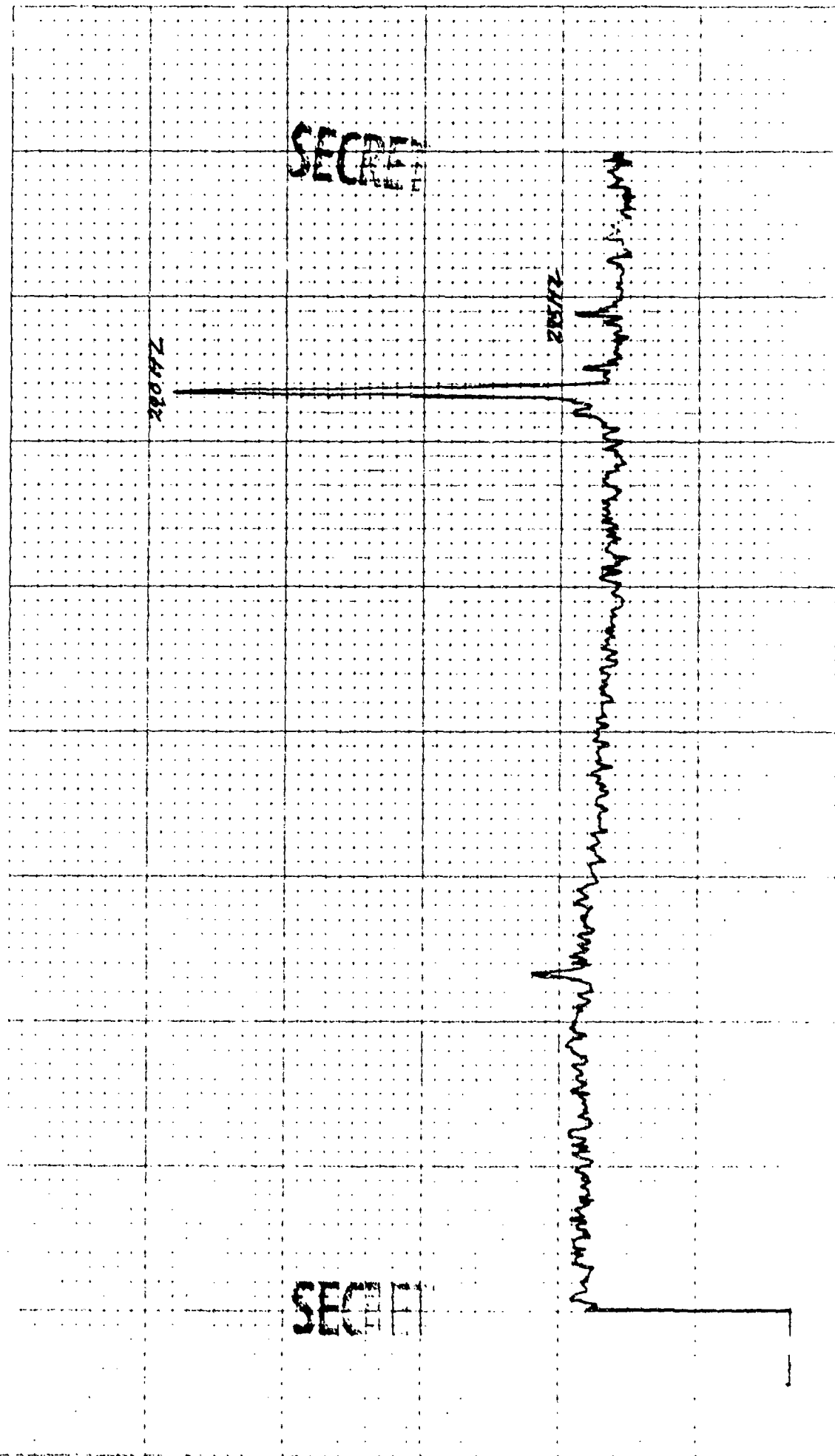
INTEGRATION TIME 320 SECS
FILTFR WTG: HANNING



46 0703

Page 2 of 2

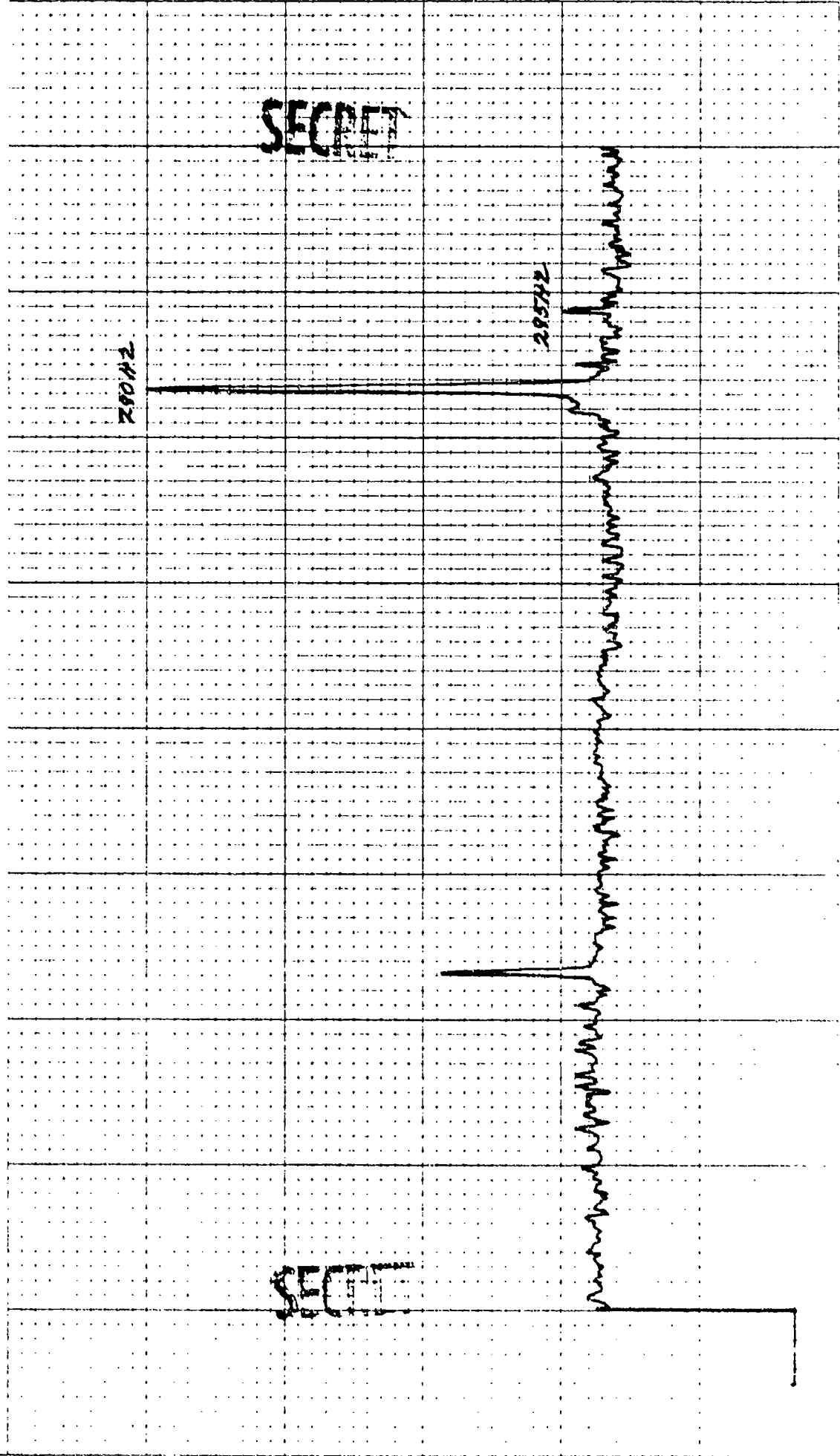
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-88 28-53 REEL: F21 INDEX X/145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -36 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 280 HZ -32 DEG. AZ STEERING



FILE 10416 TO THE HIGH...

46 0703

CONTROL: 0002-51 (007) DATE OF ANALYSIS: 1-26-53 REEL: F-19 INDEX: 1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 -0002Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
CENTER FREQ: 280 HZ -34 DEG. AZ STEERING



46 0703

CONTROL: 0202 - 51 (DPT)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-82 28-53)
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1710HZ
-36 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -20 DB
FILTFR WTG: HANNING

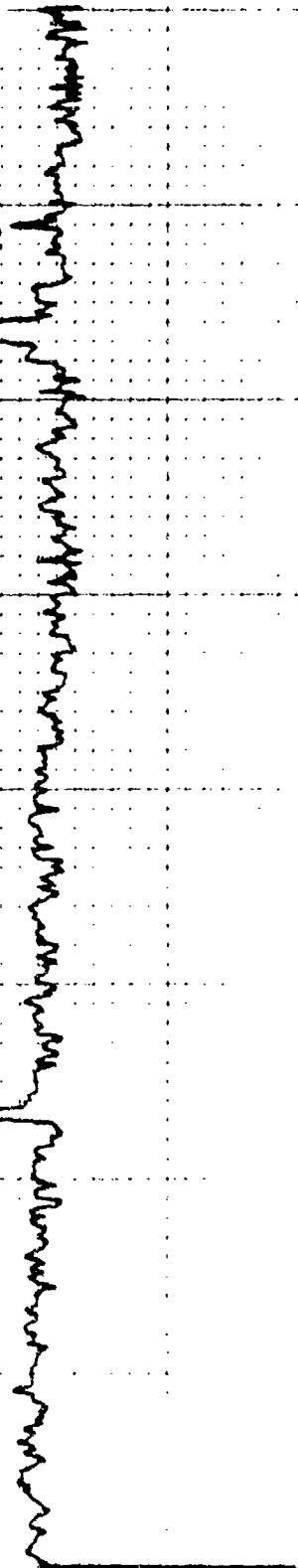
INDEX 1140

SECRET

SECRET

290 Hz

295 Hz

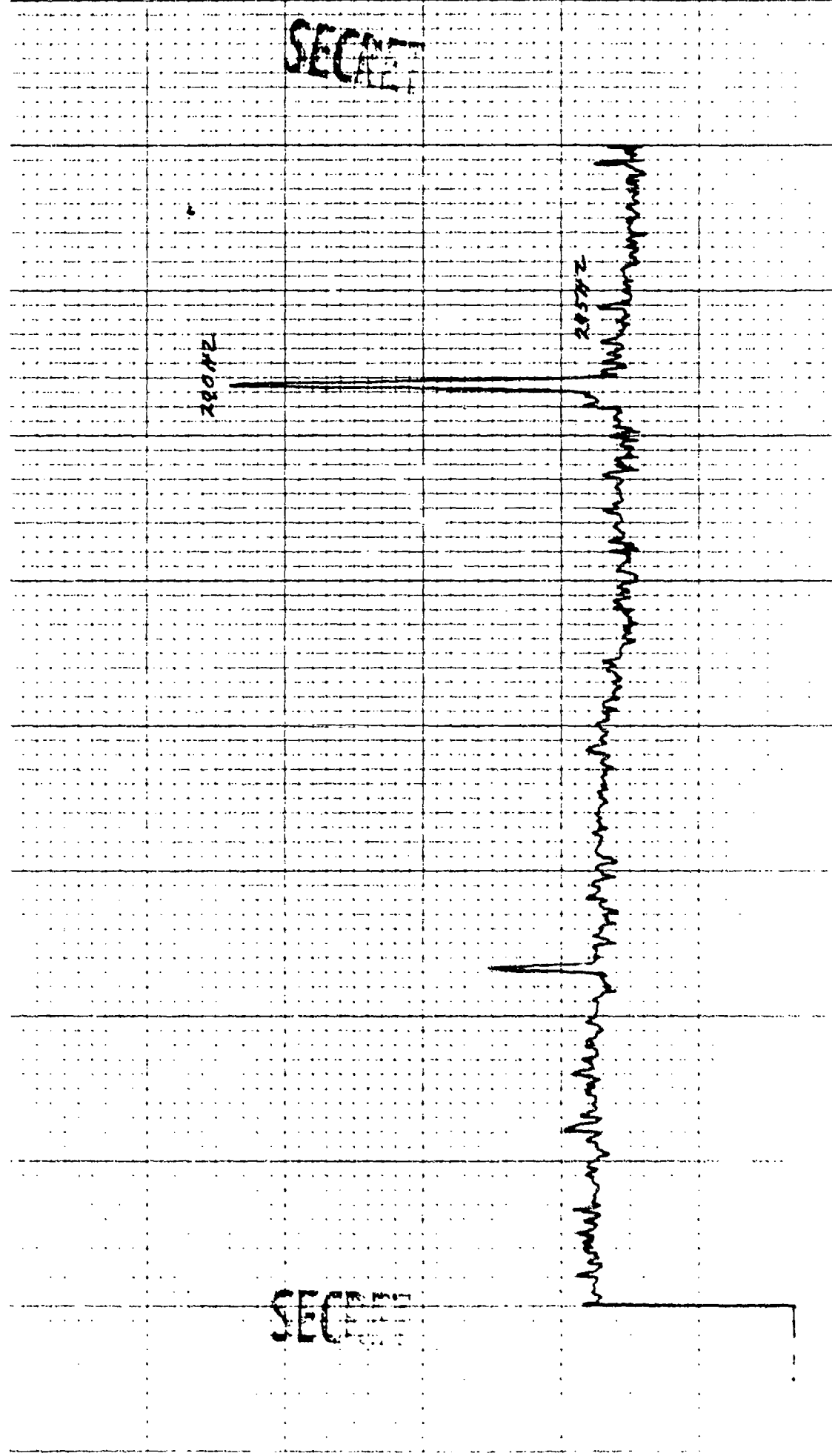


46 0703

CONTROL: 0202 - 51 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 38 DEG. AZ STEERING

REEL: F29 INDE X/145
INTEGRATION TIME 320 SECS
ATTEN: -30DB
FILTFR WTC: HANNING



24

DATE OF ANALYSIS: - - -
1-26-89-53)
DATE/TIME: 28-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-40 DEG. AZ STEERING

REEL: F29

SECRET

2292

2458E

24582

46 0703

CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X 1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTC: HANNING
CENTER FREQ: 280 HZ - 42 DEC. AZ STEERING

SECRET

SECRET

280092

now prepared and available for use

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 8 DATE 3-15-77 TIME 1501Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\text{dBV} \frac{1}{\text{ABW}}$

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$

BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO $\text{dBre}\mu\text{Pa}/1\text{Hz}$

UNCLASSIFIED

UNCLASSIFIED

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 8 DATE 3-15-77 TIME 1501Z

FREQUENCY 290 HZ

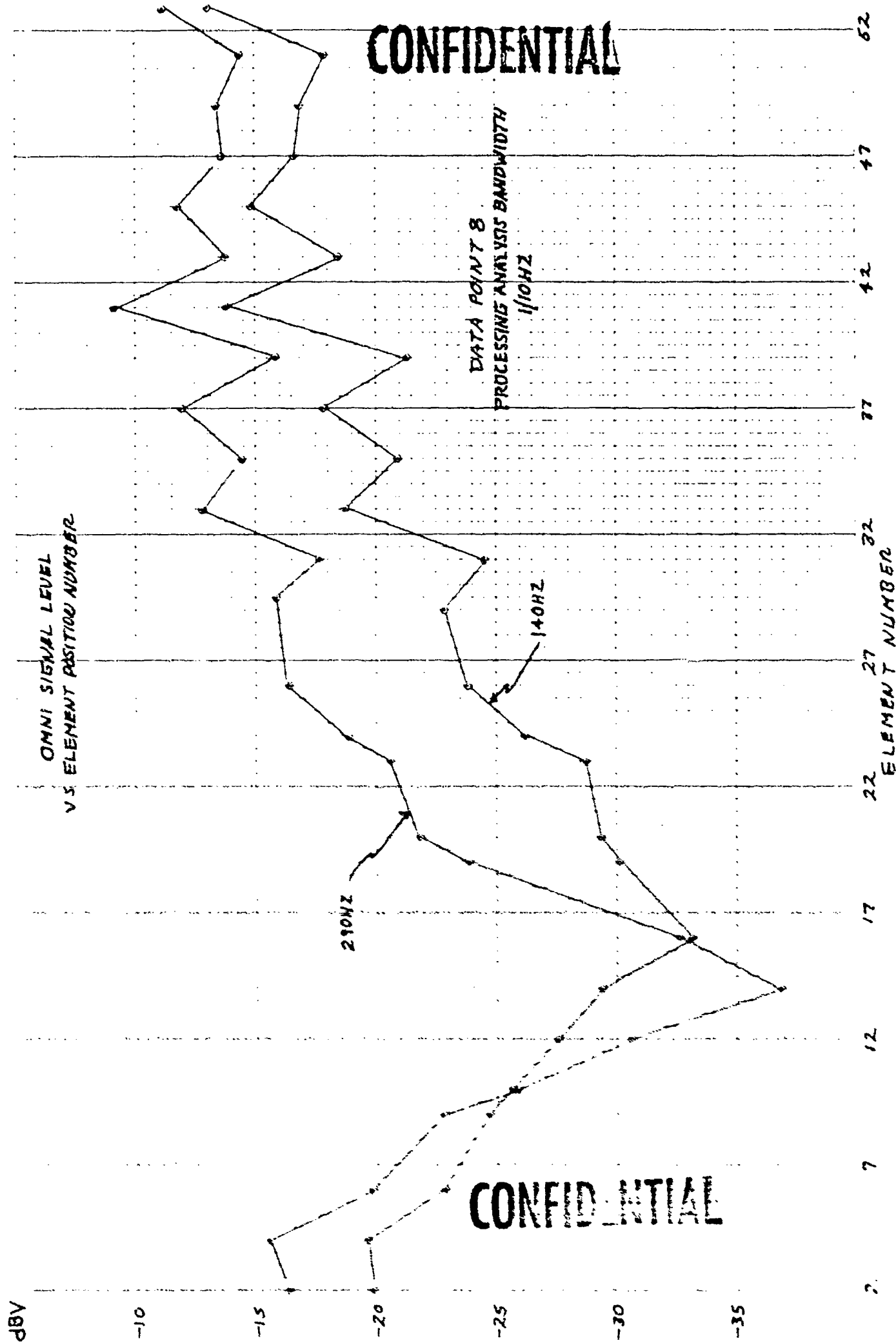
INDICATED NOISE LEVEL dBV $\frac{1}{\mu V}$	<u>-54.6</u>
SYSTEM SENSITIVITY dB/ μB	<u>-(-8) = -46.6</u>
BANDWIDTH CONVERSION TO 1 HZ BAND	<u>+8.2 = -38.4</u>
CONVERSION TO dBrePa/1HZ	<u>+100 = +61.6</u>

UNCLASSIFIED

UNCLASSIFIED

46 0703

1242 2100Z 1000 00

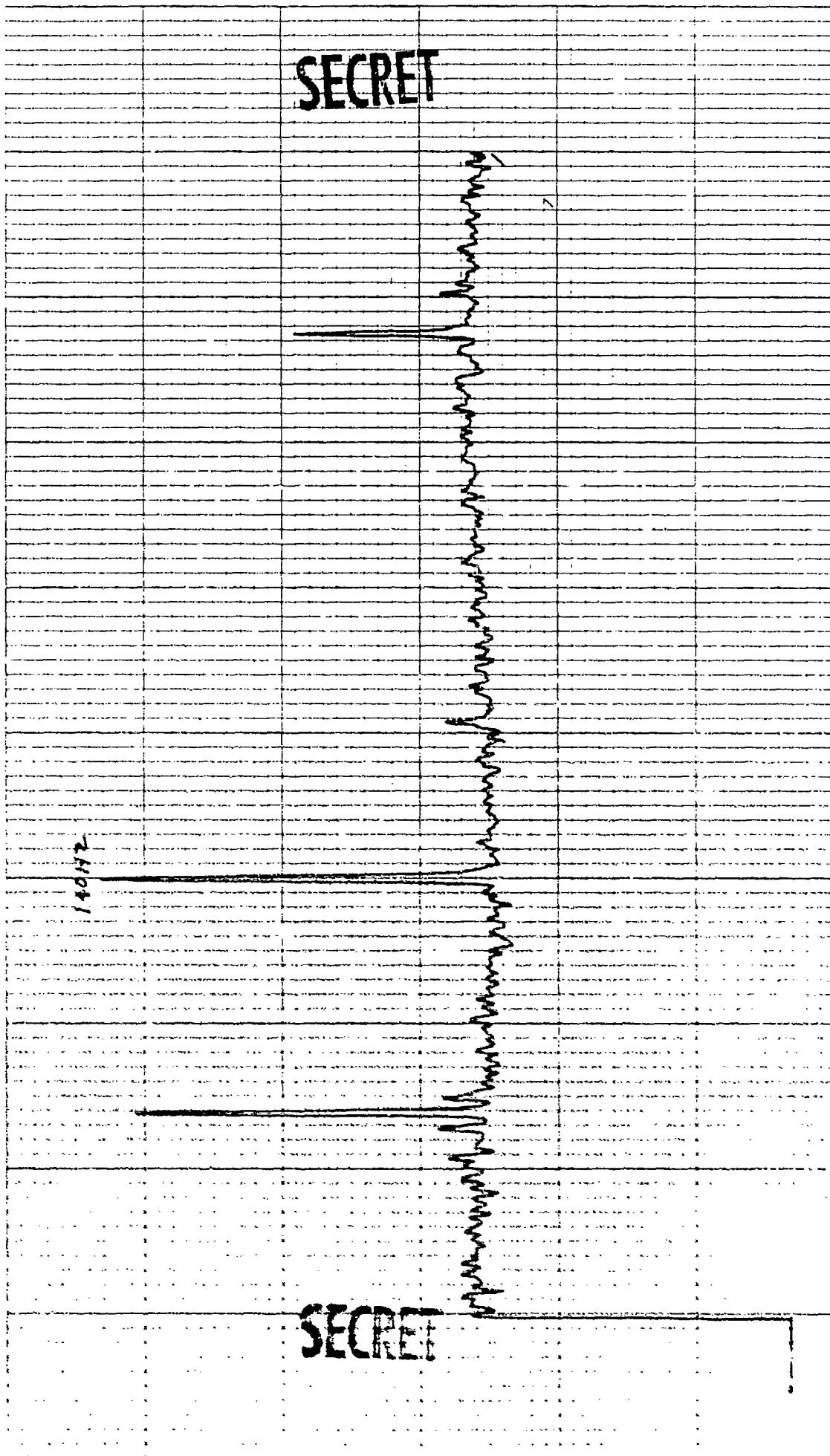


46 0703

10-2 TO THE INM. A. P. 10-2

10-2

CONTROL: 3-45 - 1501 (27) INDEX 3340
OMNI SPECTRUM (ELEMENT 2) REEL: 14
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
1 ELEMENT
DATE OF ANALYSIS:
DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING



46 6703

CONTROL: 3-5-1501 (10) DATE OF ANALYSIS: REEL: 44 INDEX 3340
OMNI SPECTRUM ELEMENT 4
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

140HZ

SECRET

SECRET

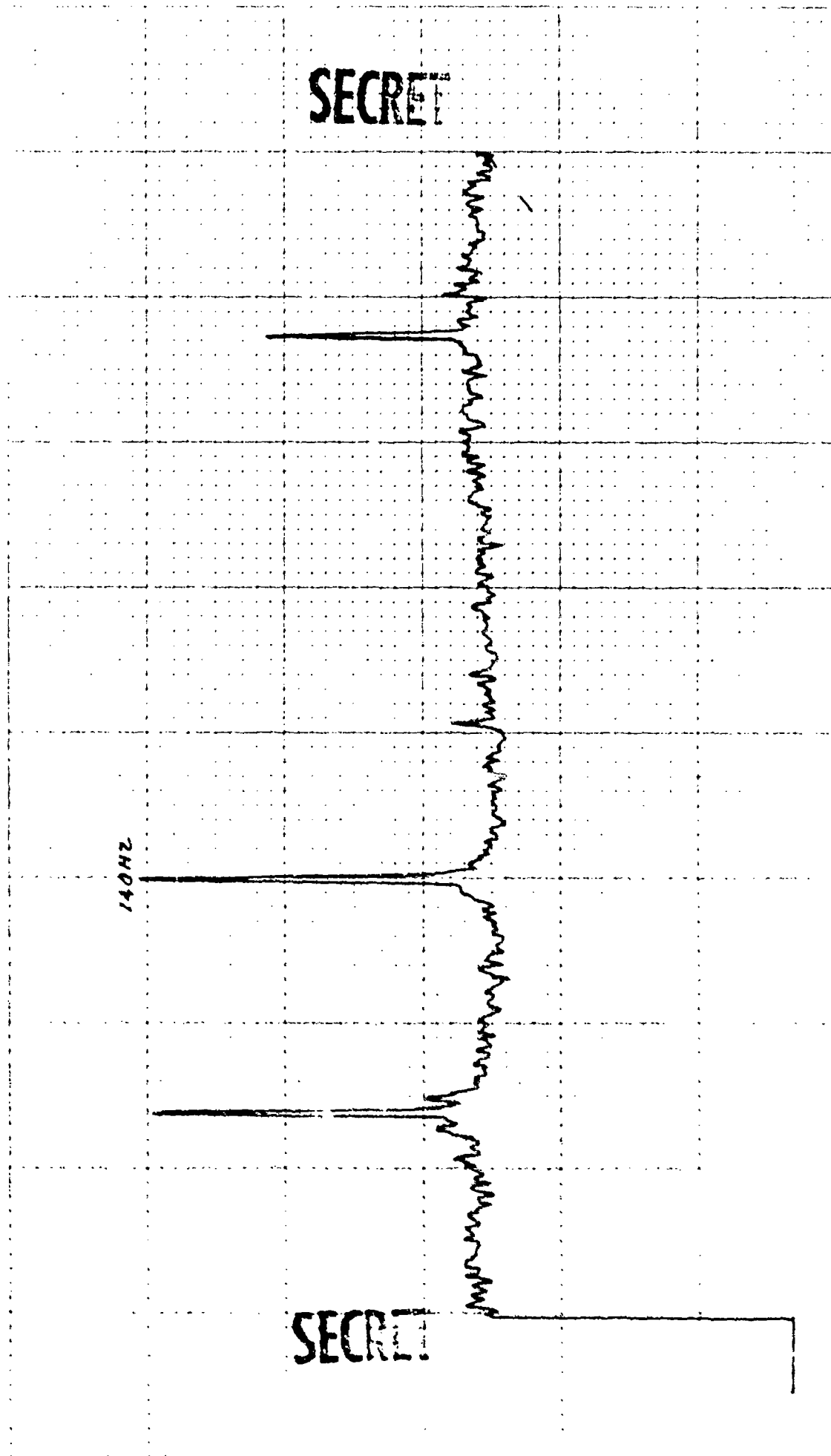
4F 9793

CONTROL: 3-45 -1501 (29)
OMNI SPECTRUM(ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-45-77 -1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 44 INDEX 3346

INTEGRATION TIME: 320 SECS
ATTEN: — DB
FILTER: HANNING



45 5753

CONTRACT: 135-1501-130 / DATE OF ANALYSIS: PERL: M4 INDEX 3340
OMNI SPECTRUM ELEMENT: 9 / DATA TIME: 24577-1501 Z
EXERCISE: REAPING STAGE ANALYSIS BANDWIDTH: 10HZ ATTN: DB
CENTER FREQ: 150 HZ -- SEC AZ STEERING WIG: HANNING
ELEMENT

140HZ

SECRET

SECRET

140HZ

16 0703

REEL: NY INDEX 3000

DATE OF ANALYSIS:

CONTROL: 1501 - 40 (208)
OMNI SPECTROM (ELEMENT 10)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-15-77 - 1501 Z
ANALYTIC BANDWIDTH: 11/10 HZ
- DEC AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WTG: HANNING

140 HZ

SECRET

SECRET

Handwritten notes:
1. 1501 - 40 (208)
2. 1501 Z
3. 11/10 HZ
4. DEC AZ STEERING
5. 320 SECS
6. - DB
7. HANNING

46 6763

CONTROL: 345-1501 (22)
OMNI SPECTRUM/ELEMENT 12)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 245-72-1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

PEEL: 14
INDEX: 3340

INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTG: HANNING

140 HZ

SECRET

SECRET

Handwritten notes:
140 HZ
150 HZ
160 HZ
170 HZ
180 HZ
190 HZ
200 HZ
210 HZ
220 HZ
230 HZ
240 HZ
250 HZ
260 HZ
270 HZ
280 HZ
290 HZ
300 HZ
310 HZ
320 HZ
330 HZ
340 HZ
350 HZ
360 HZ
370 HZ
380 HZ
390 HZ
400 HZ
410 HZ
420 HZ
430 HZ
440 HZ
450 HZ
460 HZ
470 HZ
480 HZ
490 HZ
500 HZ
510 HZ
520 HZ
530 HZ
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570 HZ
580 HZ
590 HZ
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610 HZ
620 HZ
630 HZ
640 HZ
650 HZ
660 HZ
670 HZ
680 HZ
690 HZ
700 HZ
710 HZ
720 HZ
730 HZ
740 HZ
750 HZ
760 HZ
770 HZ
780 HZ
790 HZ
800 HZ
810 HZ
820 HZ
830 HZ
840 HZ
850 HZ
860 HZ
870 HZ
880 HZ
890 HZ
900 HZ
910 HZ
920 HZ
930 HZ
940 HZ
950 HZ
960 HZ
970 HZ
980 HZ
990 HZ
1000 HZ

46 0703

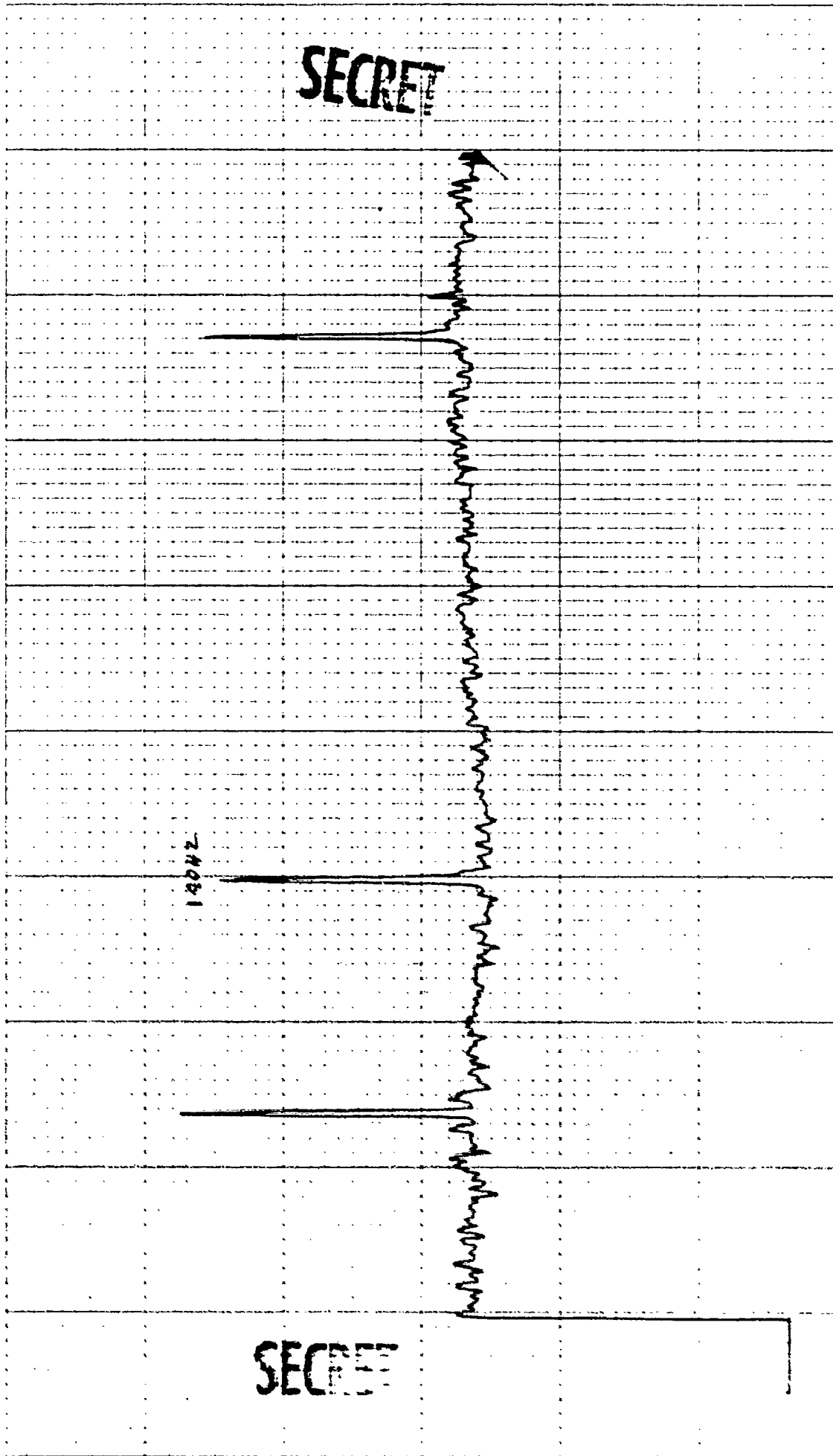
Page 1 of 1

CONTROL: 3-15 - 1501 (J3)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: 44
INDEX 3340

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTG: HANNING



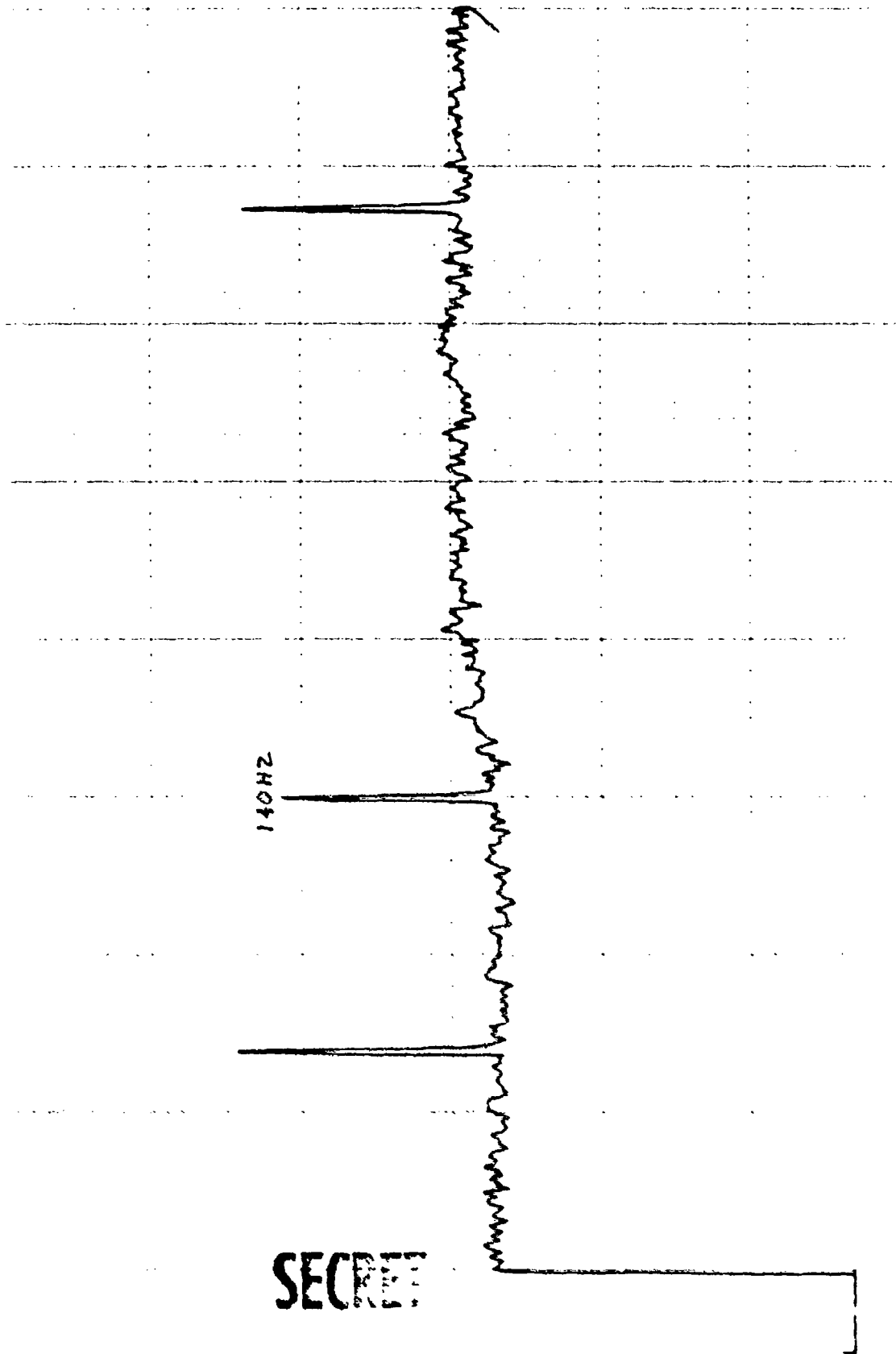
46 0703

CONTROL: 3-15-1501 (34) INDEX 3340
OMRI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
DATE: 0 ANALYSIS: REEL: 74
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS: BANDWIDTH: 1/10 HZ
DEG AZ STEERING
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WTC: HANNING

140 HZ

SECRET

SECRET



30 9793

CONTROL: 3-15 -1501 (35)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEAPING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-15-72 -1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ GIERPING

PEEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS
FILTYP
ATTN: — DB
WTC: HANNING

140 HZ

SECRET

SECRET



CONTROL: 375-1501 (20)
GMM1 SPECTRUM (ELEMENT 20)
EXPCISE: BEARING, STAKE
CENTER FREQ: 150 MHZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC 17 CLEPPING

PEEL: 174 INDEX 3340

INTEGRATION TIME: 320 SECS
FILTER
ATTEN: - DB
WTC: HANNING

140H2

SECRET

SECRET

Handwritten signature/initials across the bottom of the page.

45 0703

INDEX 3340

REEL: 44

DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (17)

OMNI SPECTRUM (ELEMENT 23)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 17-5-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

A. IEN: — DB

WTC: HANNING

140HZ

SECRET

SECRET



46, 0/03

CONTROL: 3-15 - 1501 (78)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

PEEL: 44 INDEX 7346
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING

140 HZ

SECRET

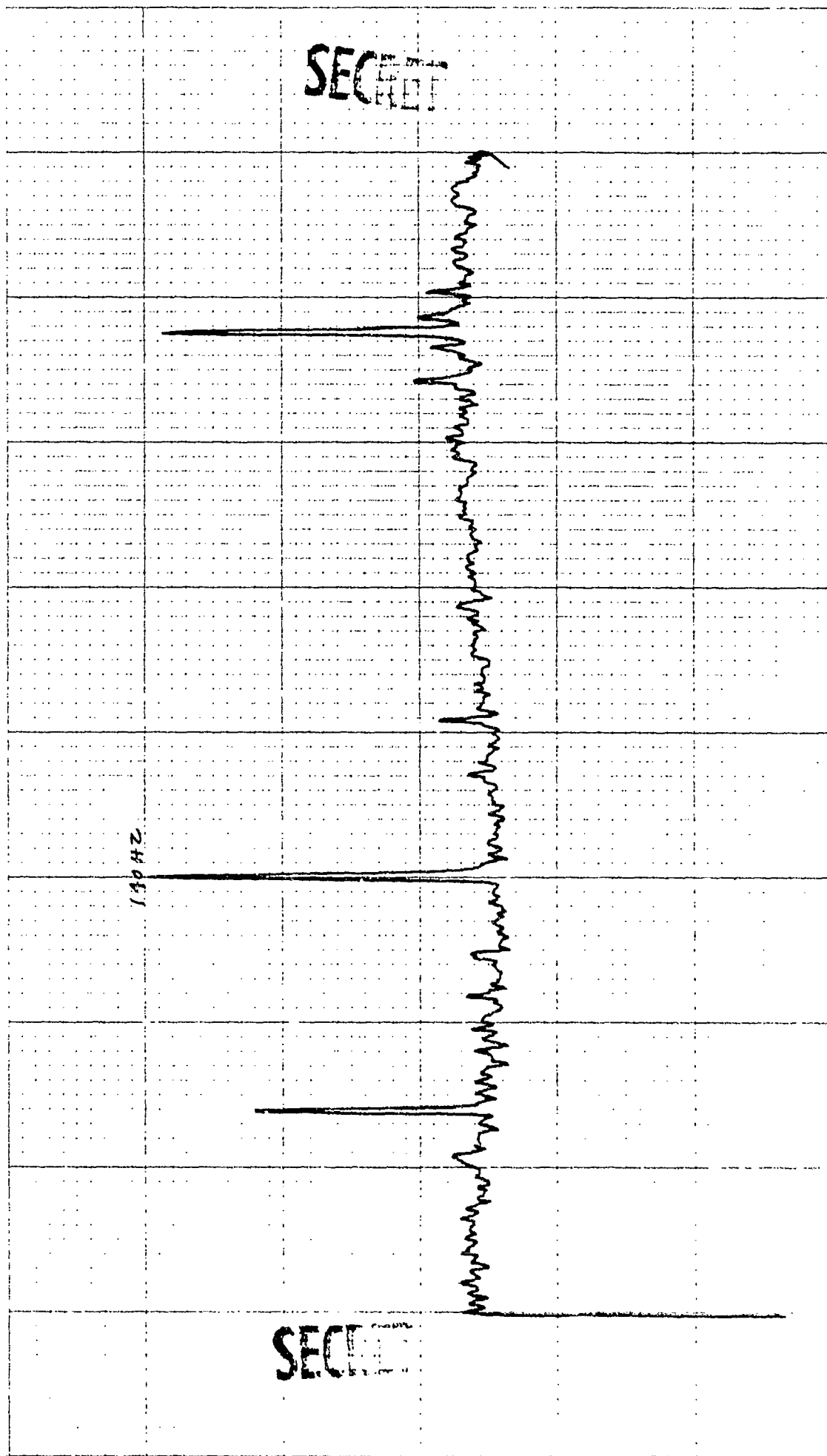
SECRET



46 0703

10 X 10 TO 1.5 INCHES

CONTROL: 3-45 - 1501 (39) DATE OF ANALYSIS: REEL: M4 INDEX 3340
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING



46 0703

CONTROL: 3-5 - 1501 (40)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

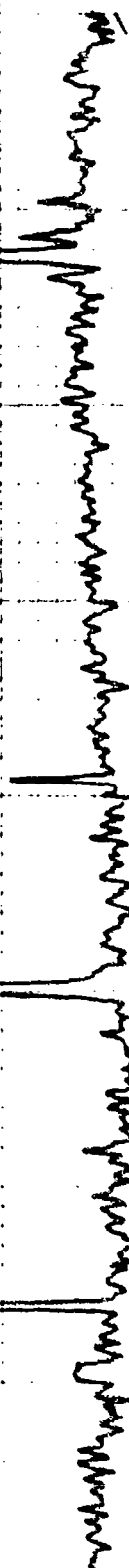
DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: MY INDEX 3340
INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET



46 0703

CONTROL: 345 - 1501 (41)
OMNI SPECTRUM/ELEMENT 31
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 11/10 HZ
— DEG AZ STEERING

REEL: 144 INDEX 3340

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

140 HZ

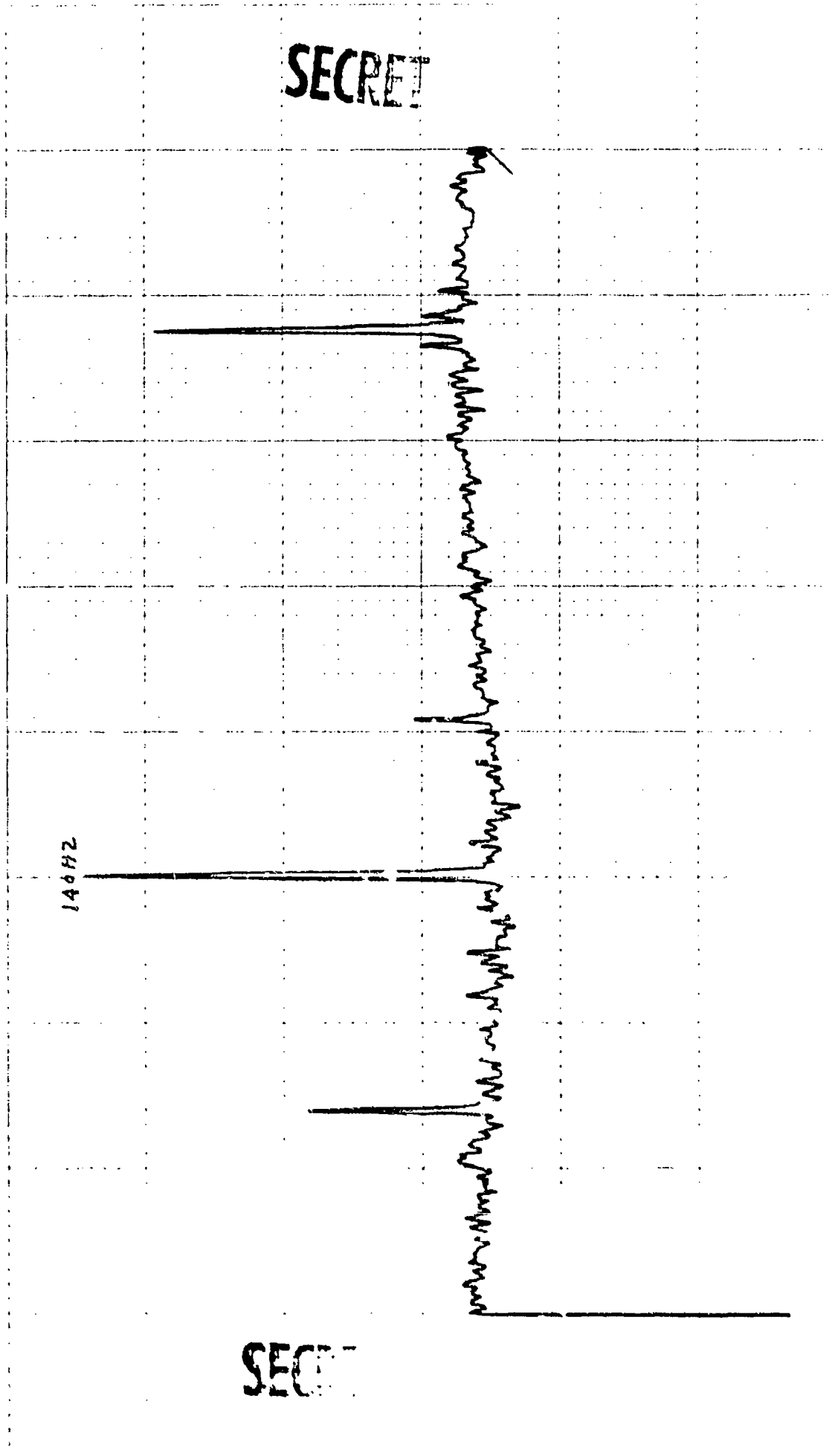
SECRET

SECRET

Handwritten notes:
The spectrum shows a single peak at 140 HZ. The peak is very sharp and narrow. The baseline is flat. The peak is at the center of the spectrum.

46 0703

CONTROL: 3-45 -1501 (42) DATE OF ANALYSIS: REEL: MY INDEX 5340
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTEN: DB
1 ELEMENT FILTER WTG: HANNING
DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING



46 0703

CONTROL: 3-45 -1501 (43)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-25-77 -1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: 44

INDEX 3346

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET



1990

CONTROL: 3-15 - 1501 (44)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
DATE OF ANALYSIS: REEL: M4 INDEX 3340
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
--- DEC AZ STEERING
ATTN: DB
WTG: HANNING
INTEGRATION TIME 320 SECS
FILTER

SECRET

190 Hz

46 0703

CONTROL: 3-15 - 1501 (45)
OMNI SPECTRUM/ELEMENT 32
EXERCISE: BEARING STAKE
CENTER FREQ. 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

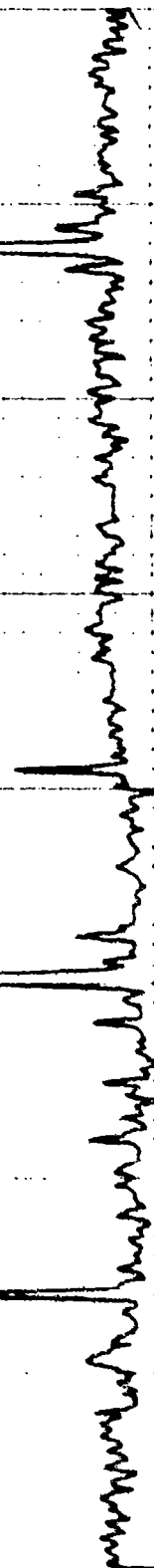
REEL: 44 INDEX 3340

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET



46 0703

CONTROL: 3-15-1501 (46) DATE OF ANALYSIS: REEL: 114 INDEX: 3340
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

140 HZ

SECRET

SECRET

THE UNIVERSITY OF CHICAGO

DATE OF ANALYSIS:

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: M4 INDEX 3340

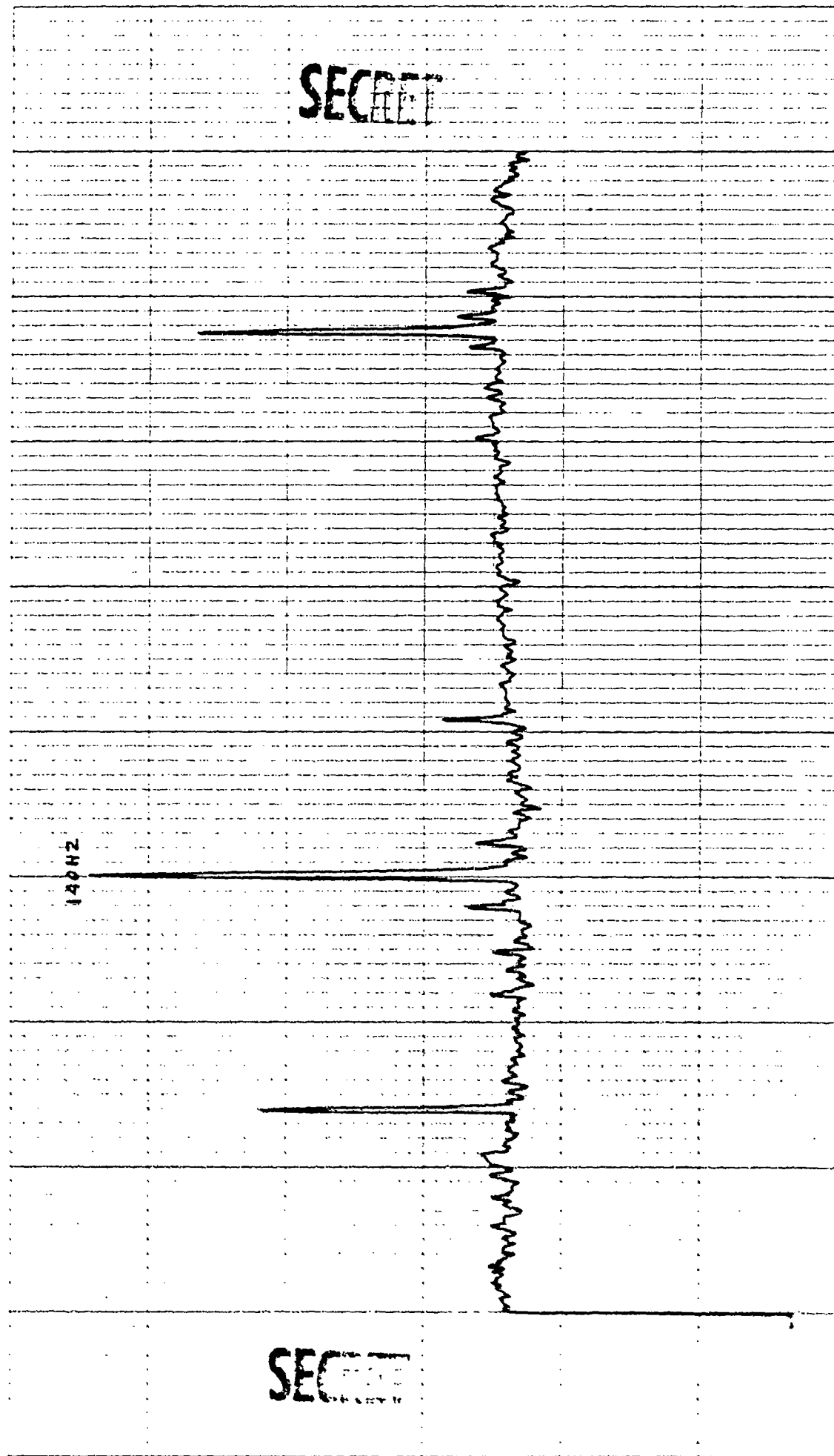
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

REEL: M4
INDEX 3340

INDEX 3340

SECRET

SECRET



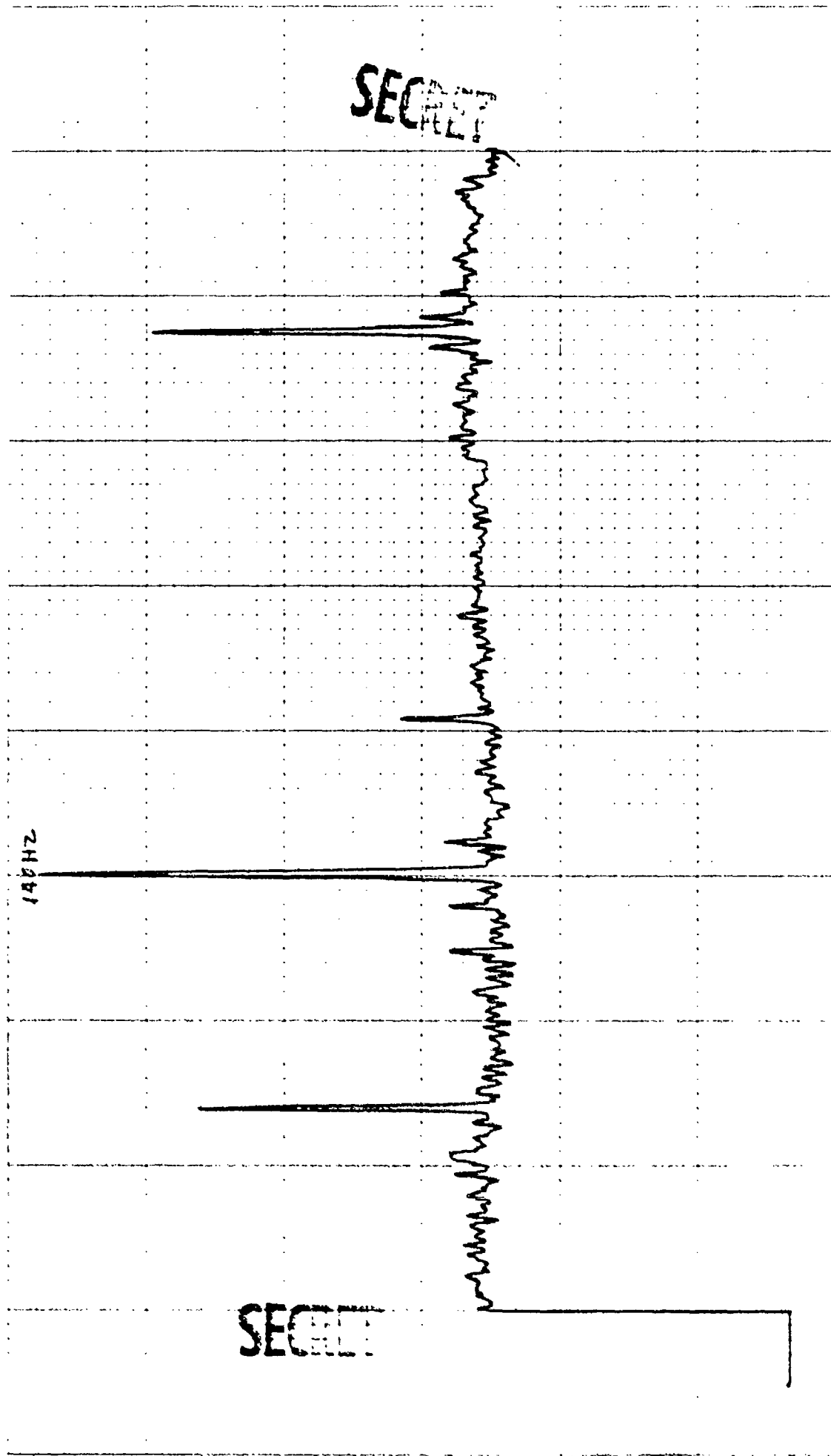
46 0703

CONTROL: 3-15 - 1501 (48)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M4
INDEX 3380

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



46 0703

CONTROL: 3-15 - 1501 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTC: HANNING

140 HZ

SECRET

SECRET



46 0703

CONTROL: 3-15 - 1501 (50)
OMNI SPECTRUM(ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-72 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG. AZ STEERING

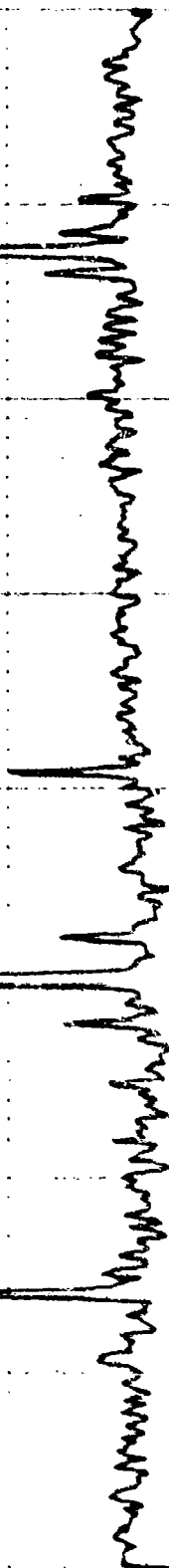
REEL: 44 INDEX 3340

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: — DB

140 HZ

SECRET

SECRET



46,0703

INDEX 3340

REEL: 44

DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (81)

OMNI SPECTRUM (ELEMENT 51)

EXERCISE: BEARING STAVE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-15-72 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

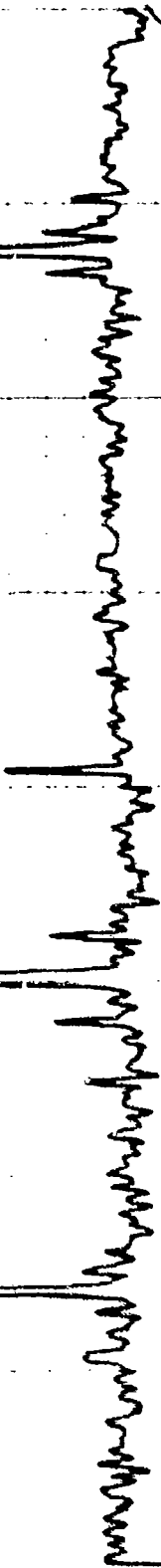
ATTN: DB

WTC: HANNING

140 HZ

SECRET

SECRET



INDEX 3340

REEL: M4

DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (52)

OMNI SPECTRUM (ELEMENT 53)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

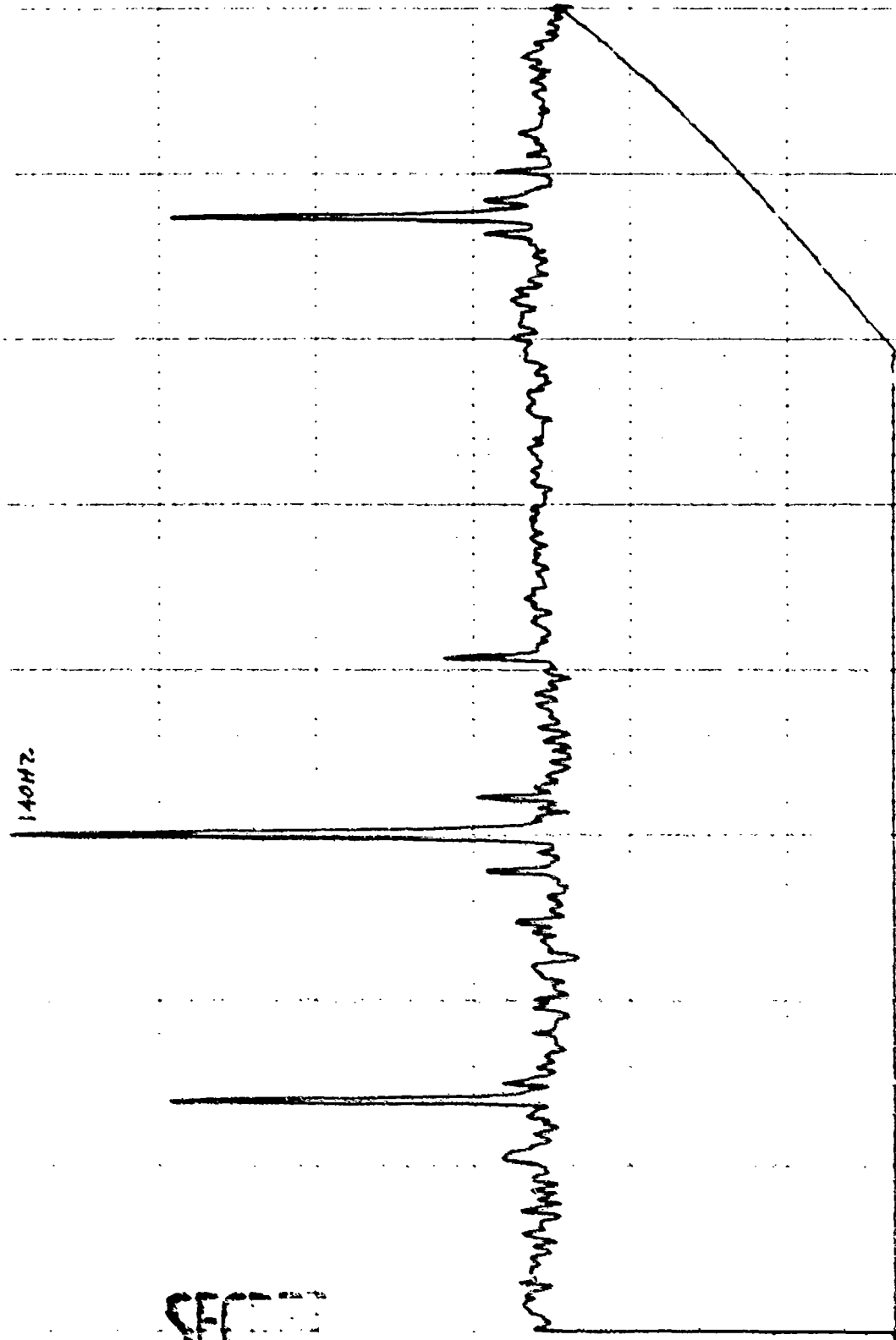
ATTEN: - DB

FILTER WTG: HANNING

140 HZ

SECRET

SECRET



10 X 10 TO THE INCH • 1 X 10 HICKES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

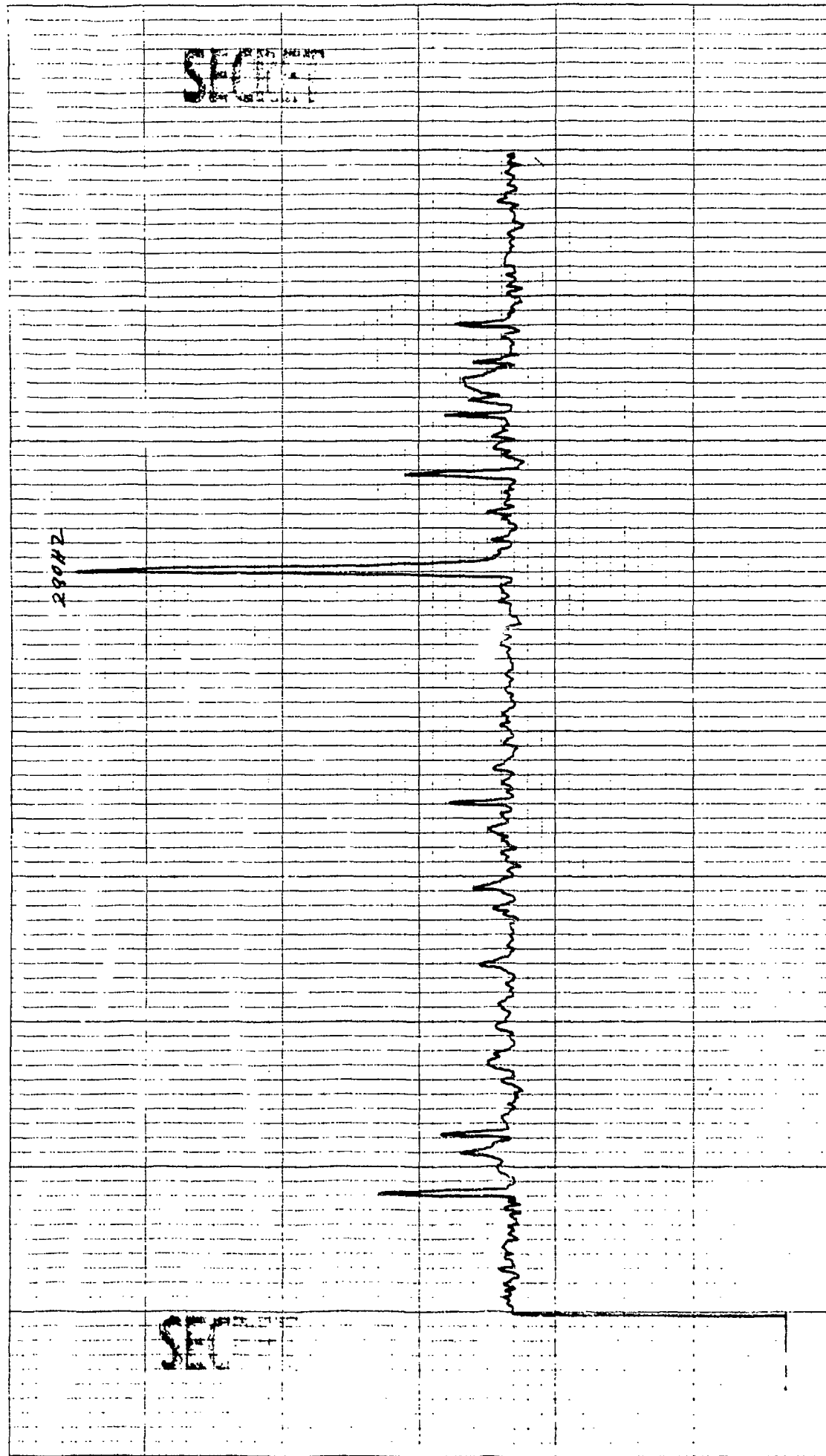
CONTROL: 3-15-1501 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 114 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



45 0703

CONTROL: 3-75-1501 (2) REEL: 44 INDEX 3840
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEAPING STAKE
CENTER FREQ: 200 HZ
DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: — DB
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
— DEG AZ STEERING

200 HZ

SECRET

SECRET

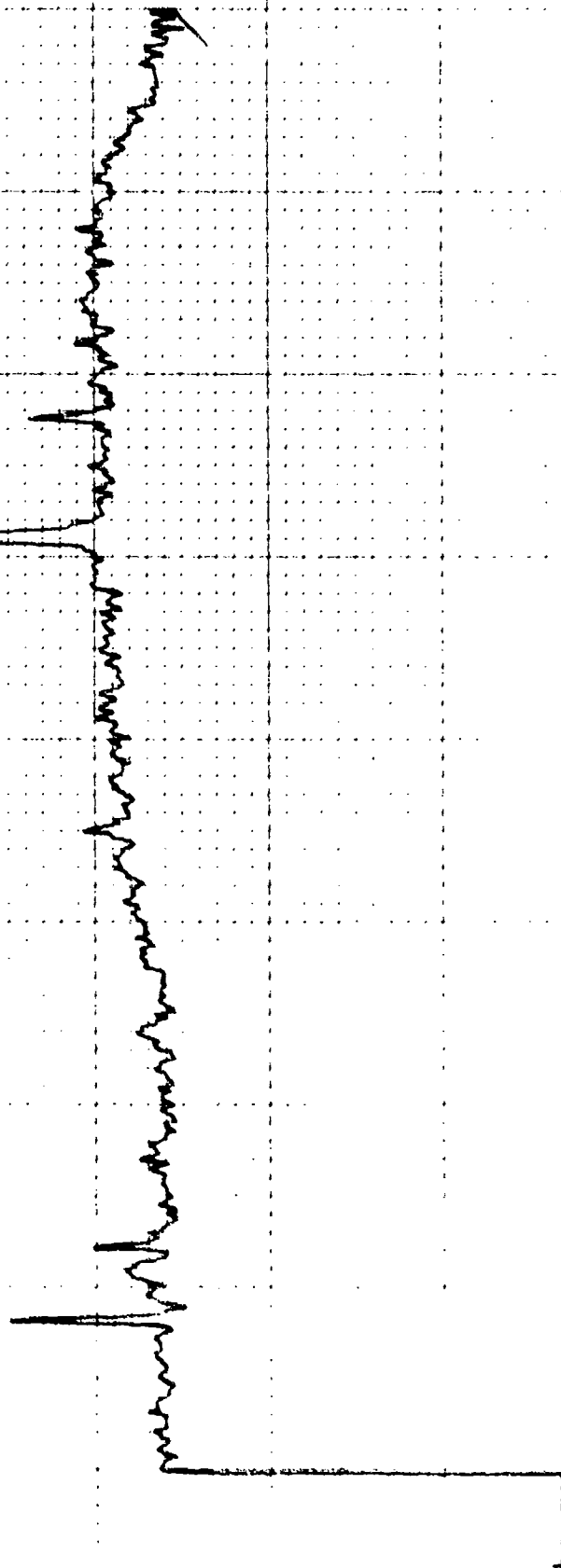


Figure 6

CONTROL: 3-15-1501 (3) REEL: 144 INDEX 3340
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS:
DATE/TIME: 3-15-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

CONTROL: 3-15-1501 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTC: HANNING

REEL: 44 INDEX 3340

INDEX 3340

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29092

46 0703

INDEX 3340

REEL: 44

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: — DB
 FILTER WTC: HANNING

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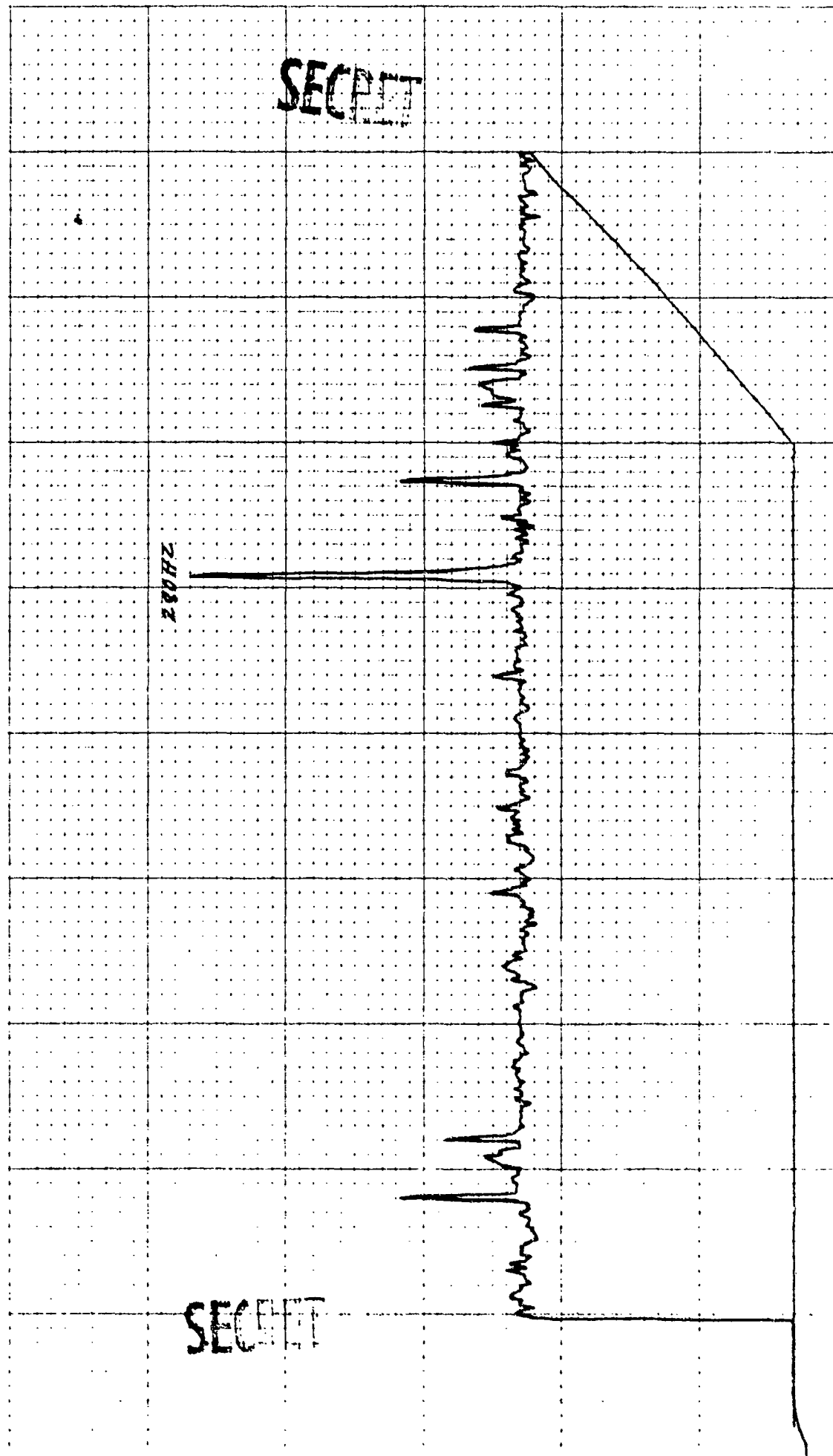
SECRET

290A2

10.4 IN TO THE INCH: 1/4 IN

46 0703

CONTROL: 3-15-1501 (5) DATE OF ANALYSIS: REEL: M4 INDEX 3340
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING
— DEG AZ STEERING



REF: 10-16 TO THE INCH: 10-16-10-16

46 0703

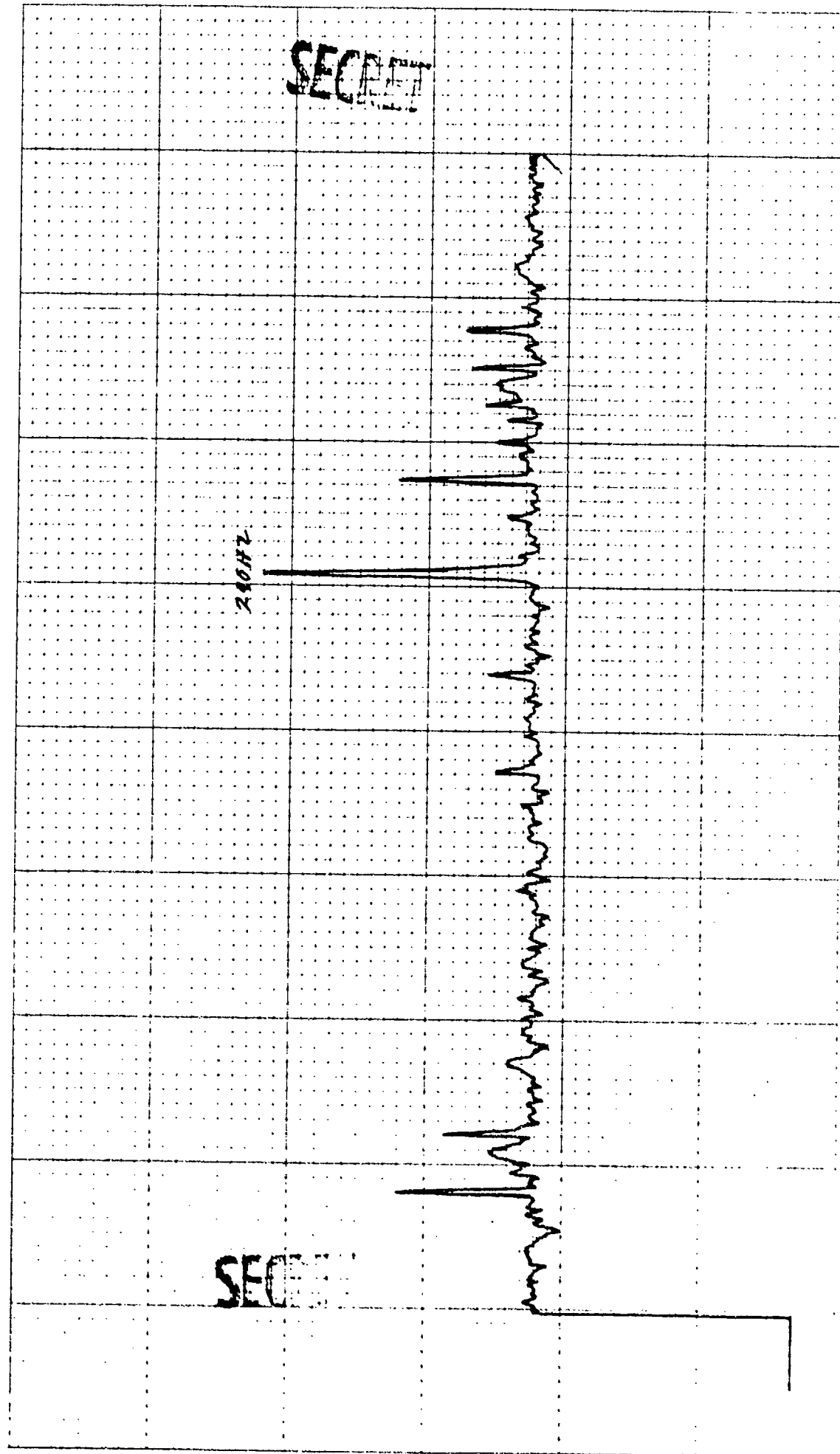
CONTROL: 3-15 - 1501 (6)
OMNI SPECTRUM(ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: 14 INDEX 3340

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



46 0703

1602 10/10/77 TO THE BOMB: 10/10/77

CONTROL: 7-15 -1501 (7)
OMNI SPECTRUM(ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

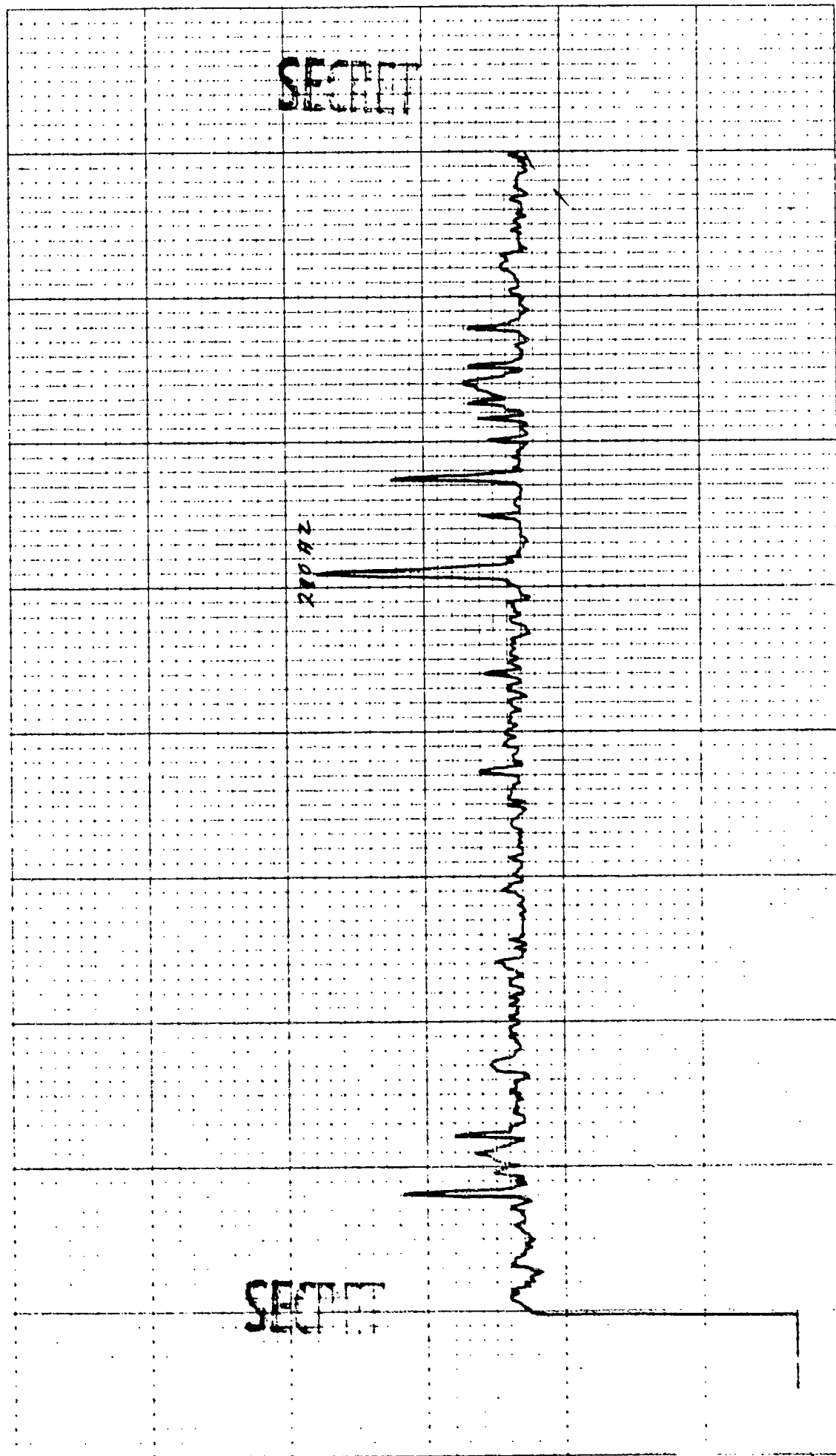
DATE/TIME: 3-15-77 -1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: H44

INDEX 3340

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WTG: HANNING



46 0703

CONTROL: 345 -1501 (8)

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 150/2
ANALYSIS BANDWIDTH: 1/10HZ
----- DEG AZ STEERING

REEL: 44
INDEX: 3340

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

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21042

~~SECRET~~

Figure 1

REEL: 44 INDEX 3390

DATE OF ANALYSIS: _____
DATE/TIME: 345-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG A2 STEERING

REEL: 44

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS:

DATE/TIME: 3-5-77-1501 Z

ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

INTEGRATION TIME 320 SECS
FILTER

ATTN: — DB
TC: HANNING

29042

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Year	Number of people (millions)
1950	10
1960	12
1970	18
1980	25
1990	30
2000	35

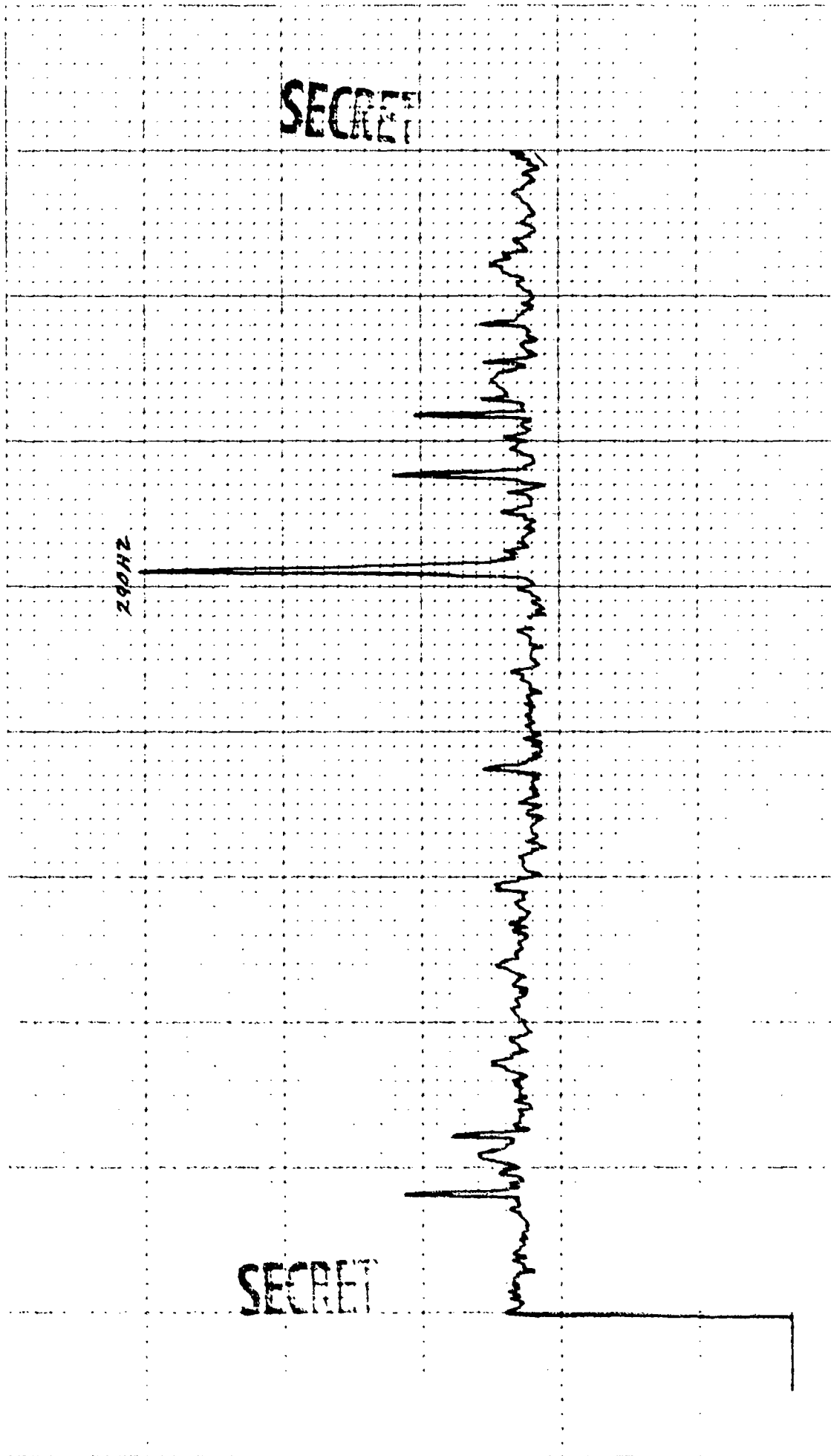
46 0703

CONTROL: 3-15-1501(10.)
OMNI SPECTRUM(ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: 44 INDEX 3740

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



46 0703

CONTROL: 3-15 - 1501 (11)
OMNI SPECTRUM(ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 11/10 HZ
— DEG AZ STEERING

REEL: M4

INDEX J340

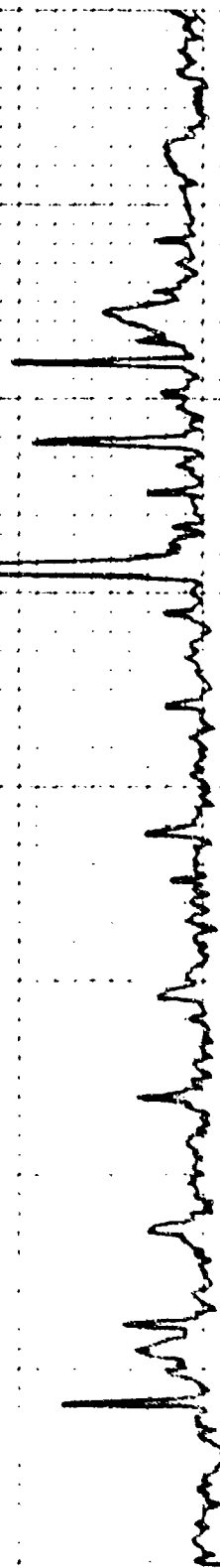
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTEN: — DB

280 HZ

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10E 10.000 10.000 10.000

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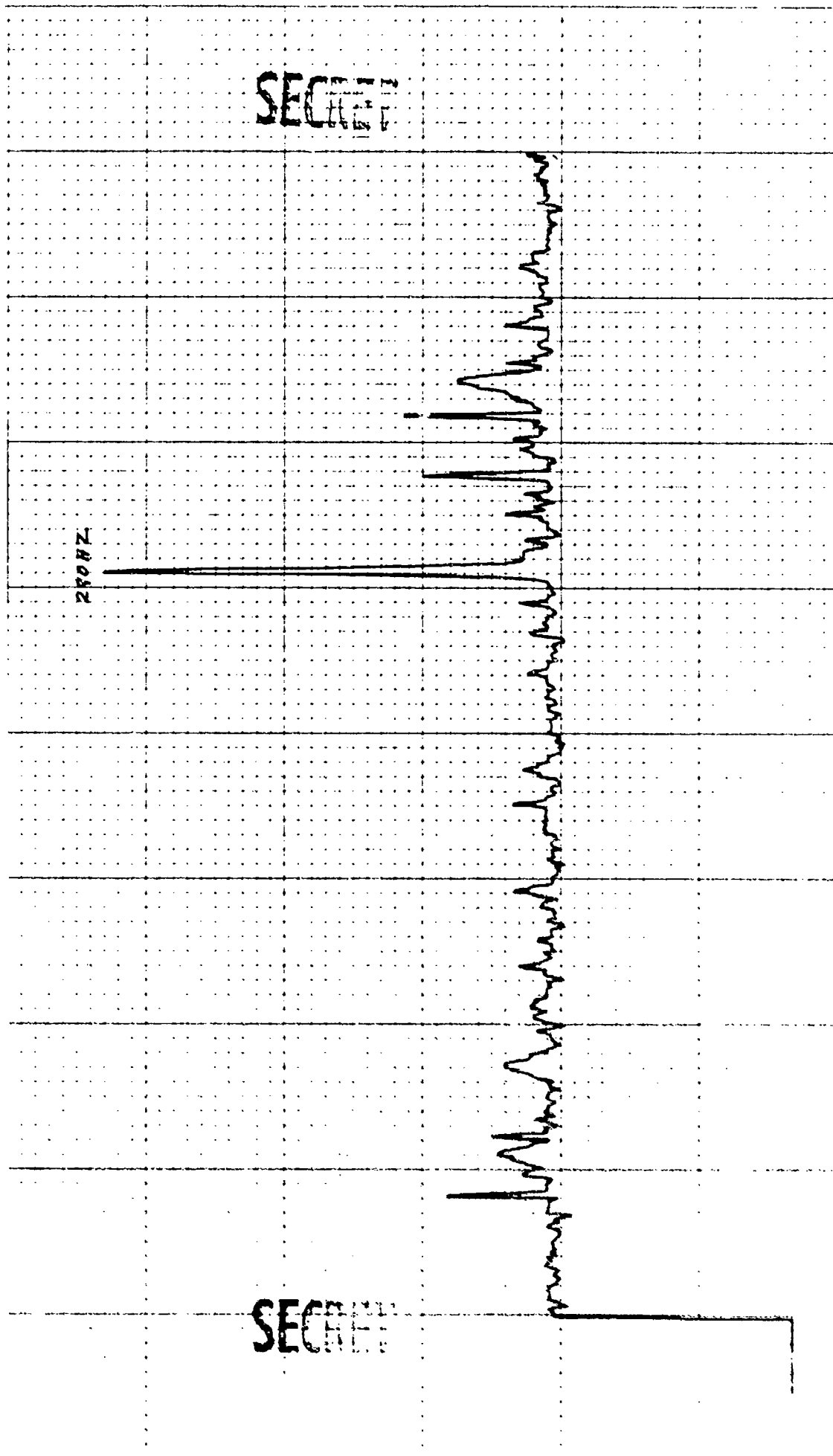
CONTROL: 3-15-1501 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: 114 INDEX 3340

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



46 0703

CONTROL: 375-150/ (13)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: 44 INDEX 3740

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTC: HANNING

200 HZ

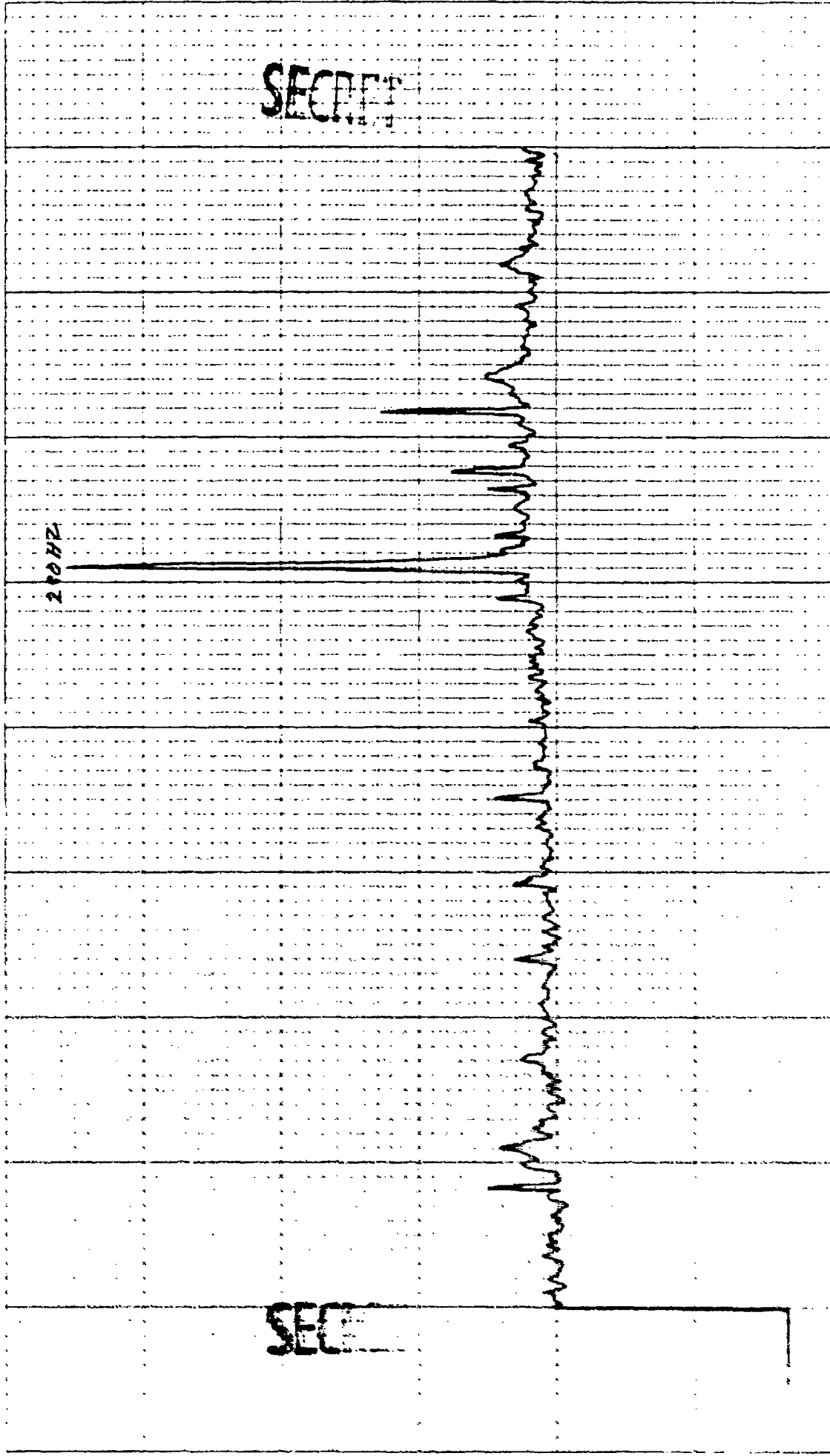
SECRET

SECRET

Figure 1

CONTROL: 3-15-1501 (14) INDEX 3740
OMNI SPECTRUM (ELEMENT 29) REEL: 14
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
I ELEMENT
DATE OF ANALYSIS:
INTEGRATION TIME 320 SECS
ANALYSIS BANDWIDTH: 1/10 HZ
DATE/TIME: 3-15-77 - 1501 Z
ATTN: — DB
WTC: HANNING
— DEC AZ STEERING
FILTER

SECRET



CONTROL: 3-15-1501 (15)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

DEG AZ STEERING

REEL: 44

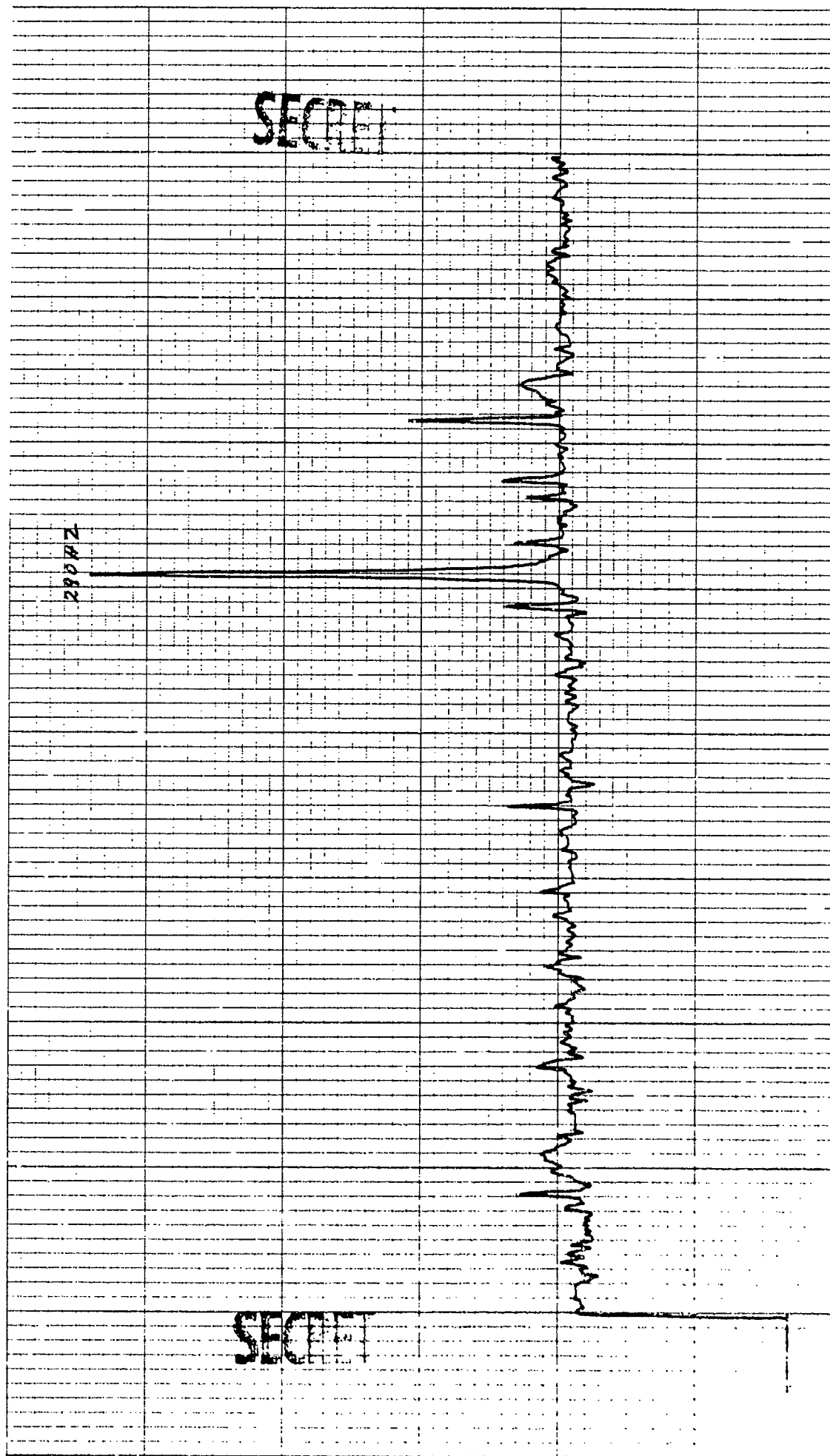
INDEX 3340

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING



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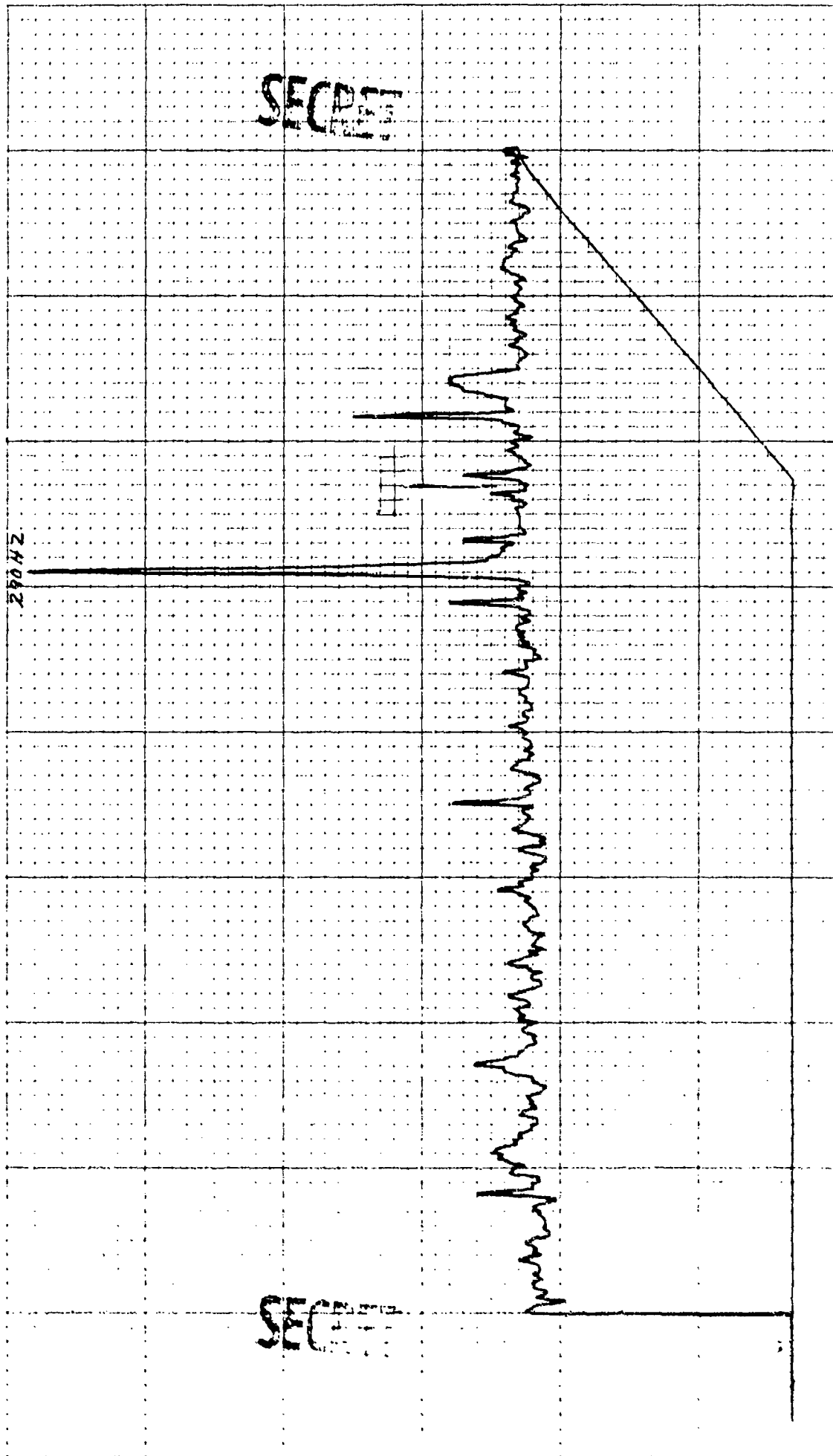
CONTROL: 1501 - 40 (DPB)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: MY INDEX 3000

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



CONTROL: 3-15 -1501 (17)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS: _____
DATE/TIME: 3-15-77 -1501 2
ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS
ATTN: DB
WTC: HANNING

REEL: 144
INDEX 3340

29072

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1252 10 X 10 TO THE INCHES 12 1/2 X 10 INCHES
REUSFEL & ESSER CO. CHICAGO, ILL.

46 0703

CONTROL: 3-15-1501 (18)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 180 HZ
1 ELEMENT

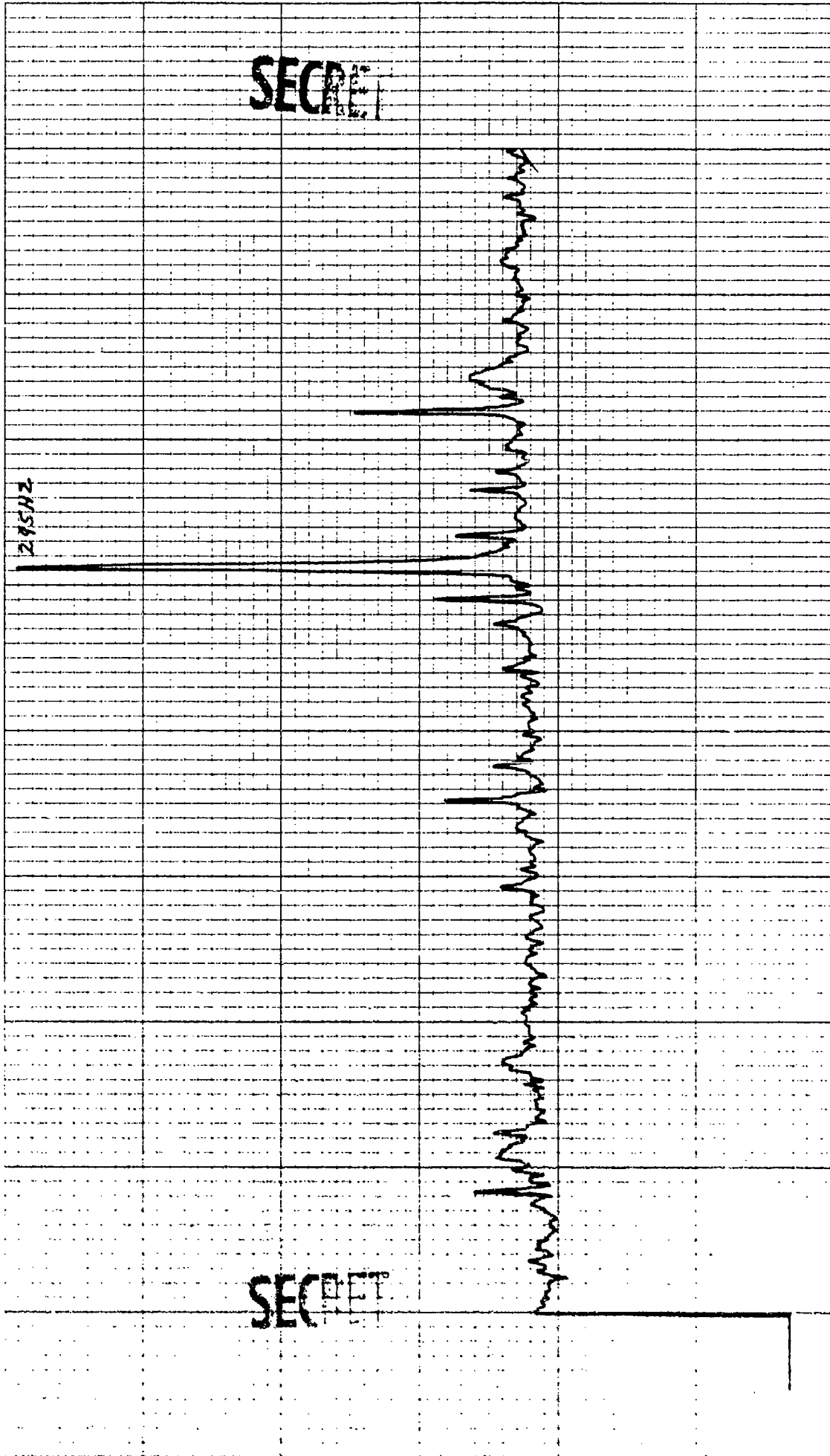
DATE OF ANALYSIS:

REEL: M4

INDEX 3346

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER
ATTEN: — DB
WTG: HANNING

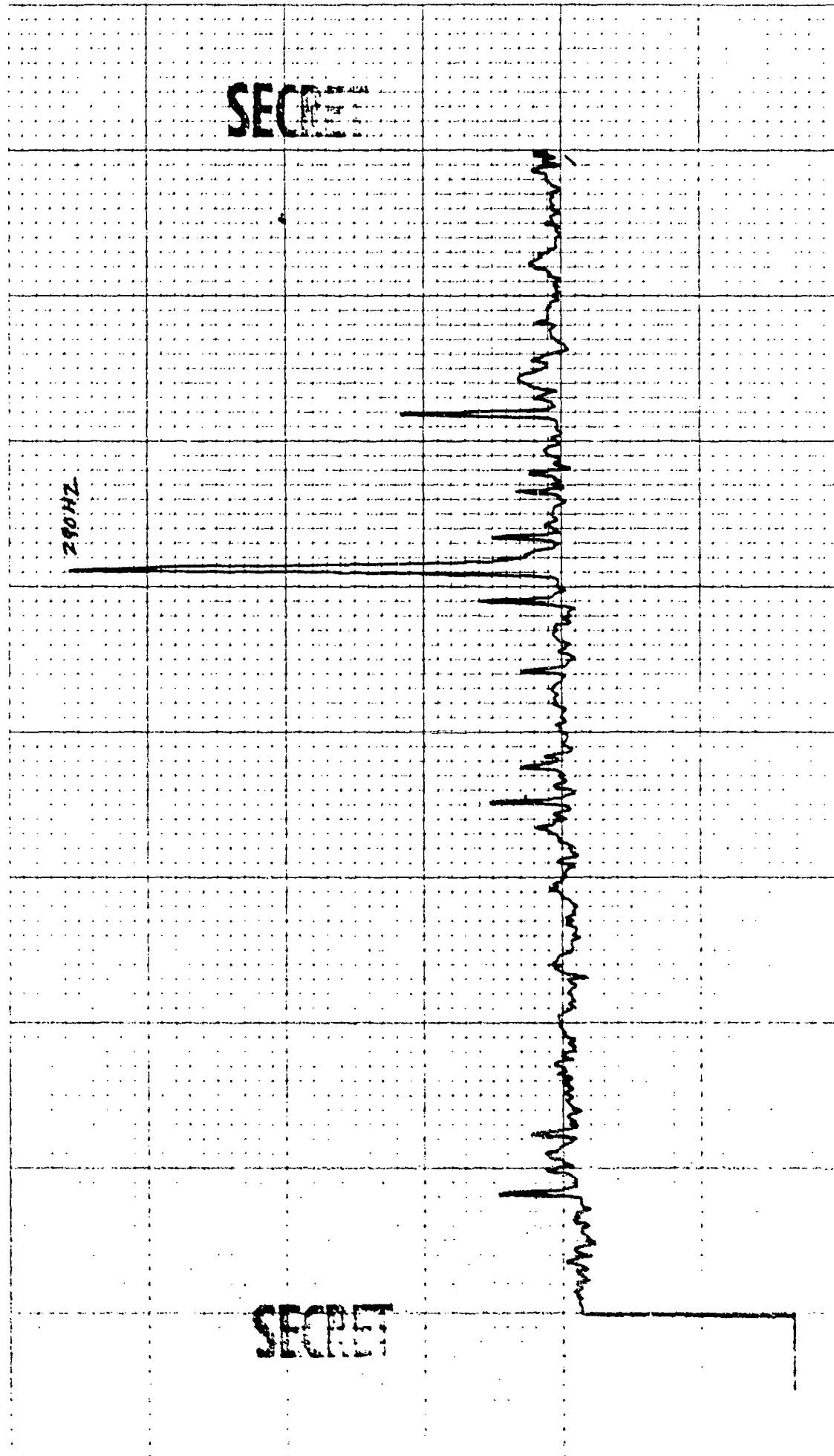


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CONTROL: 3-15-1501 (19) DATE OF ANALYSIS: REEL: 114 INDEX 3340
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING



REF ID: A60703

46 0703

CONTROL: 3-15 -1501 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 -1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

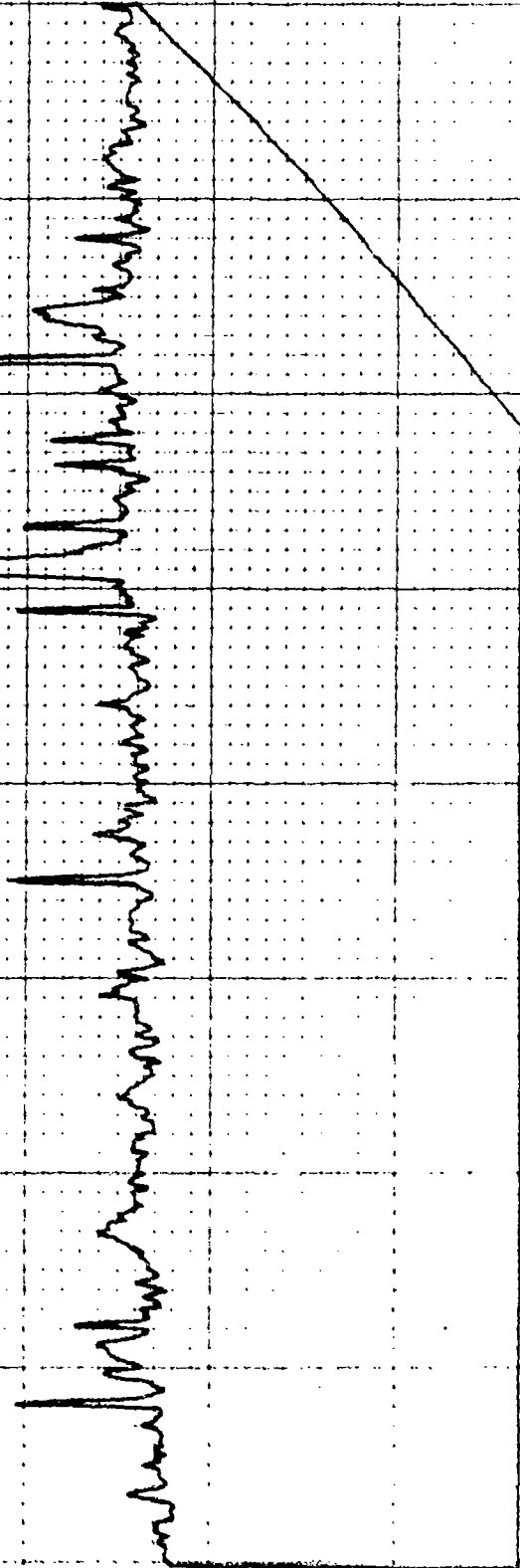
REEL: 174 INDEX 3340

INTEGRATION TIME 320 SECS
FILTER
ATTN: — DB
WTG: HANNING

290 HZ

SECRET

SECRET



16 X 10 TO THE INCH + 7 X 10 TO THE INCH
KEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-15 -150/ (21)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

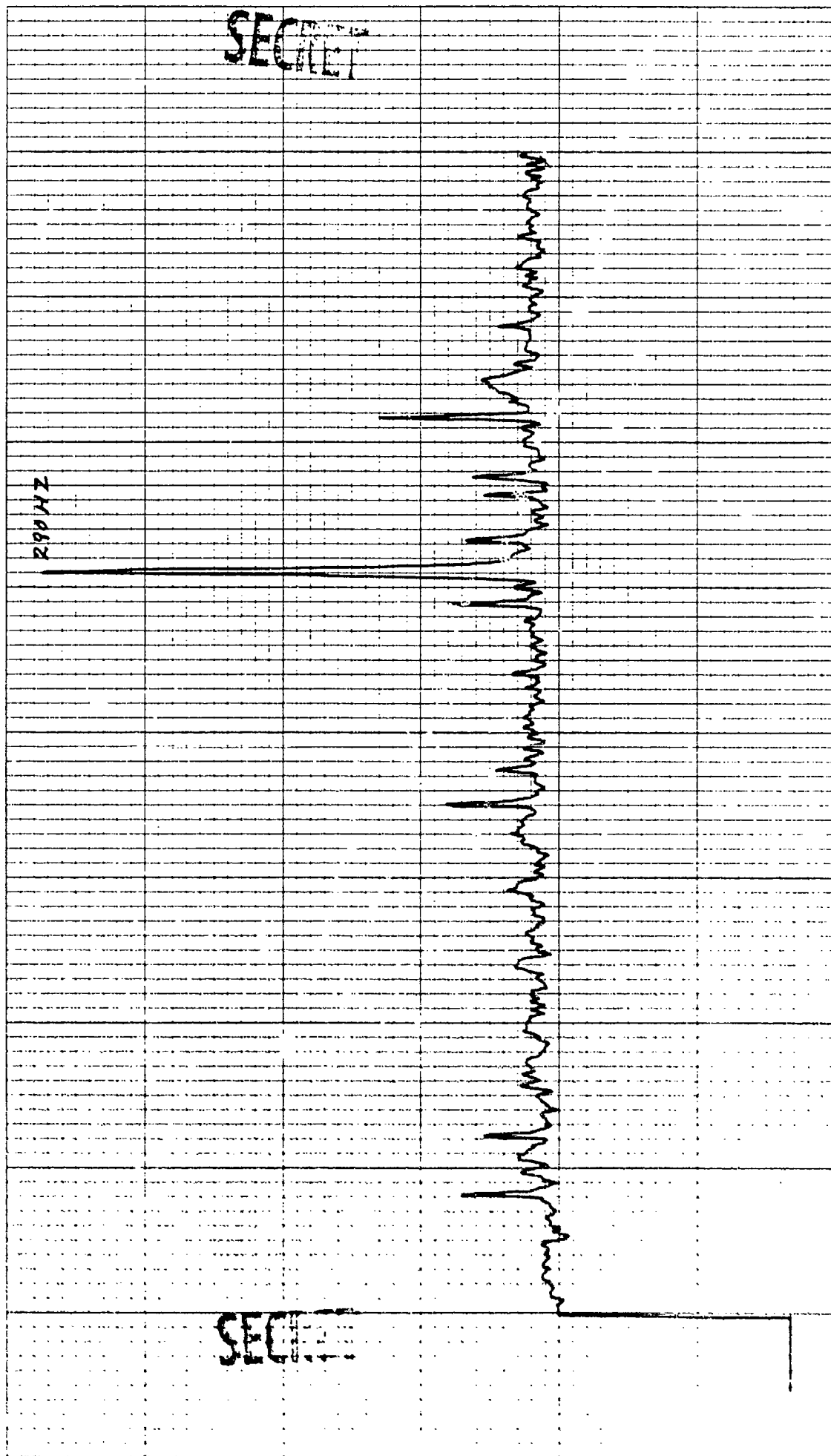
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 -1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M4

INDEX 3340

INTEGRATION TIME 320 SECS
FILTER — DB
ATTEN: — DB
WTC: HANNING



162 3.11.77 THE HON. C. J. P. 162

46 0703

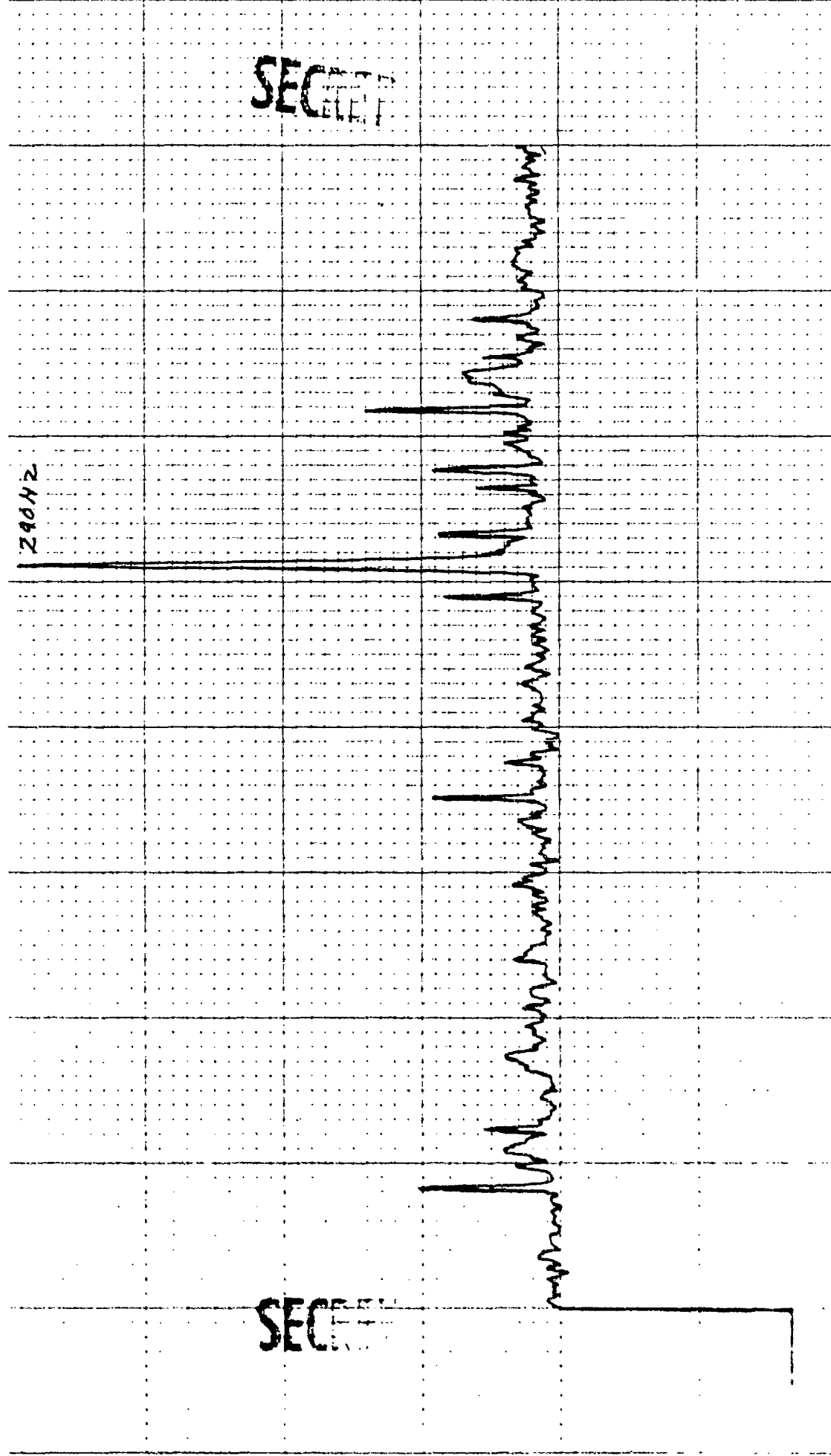
CONTROL: 345-1501 (22)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 345-77-1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

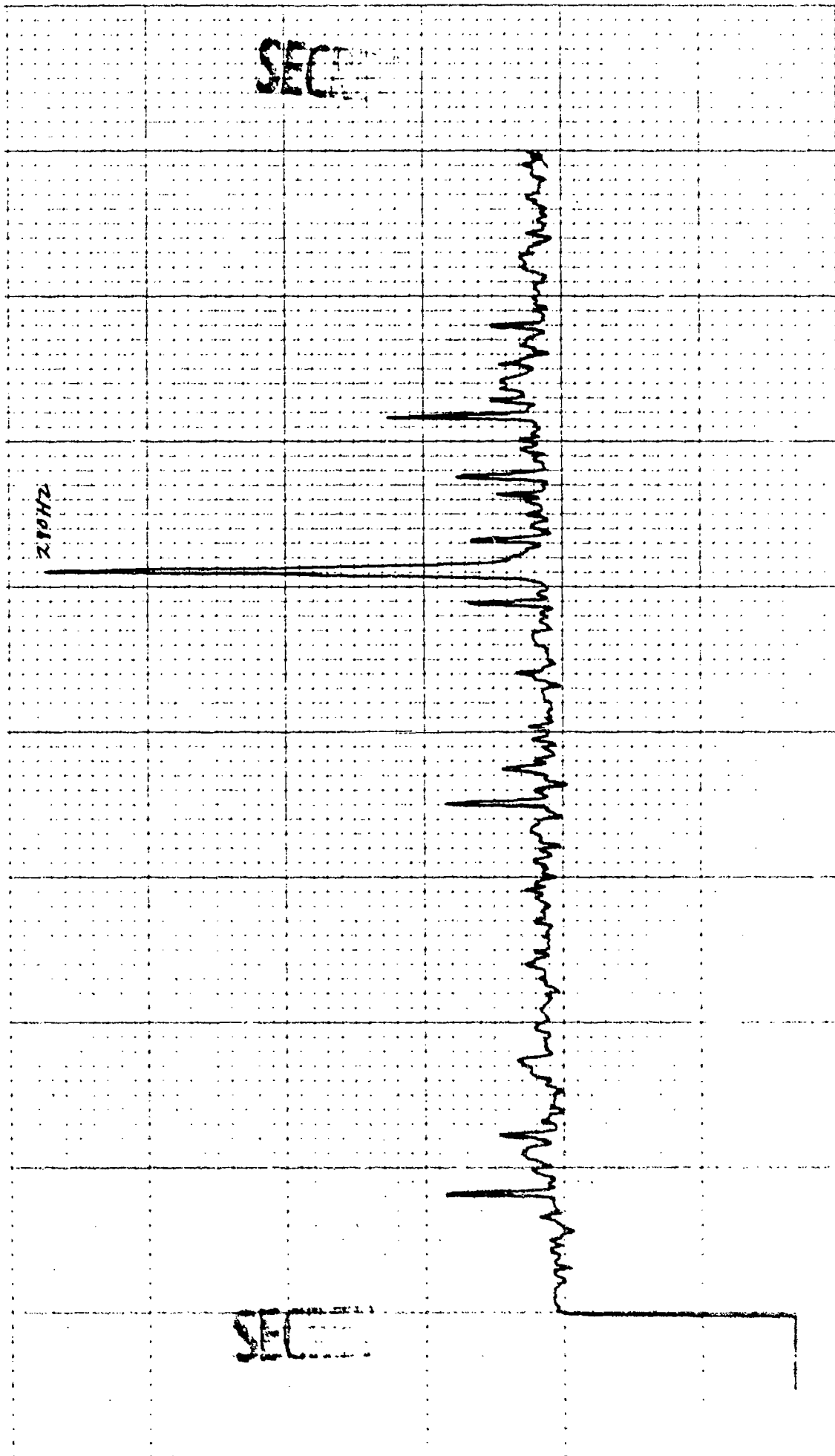


46 0703

10-2-77 10:00 AM 10:00 AM 10:00 AM

CONTROL: 3-15 -1501 (23) DATE OF ANALYSIS: REEL: 44 INDEX 3390
OMNI SPECTRUM(ELEMENT 47) DATE/TIME: 3-15-77 -1501 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 290 HZ DEG AZ STEERING
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



46 0703

1402 2100 2000000 0.0000

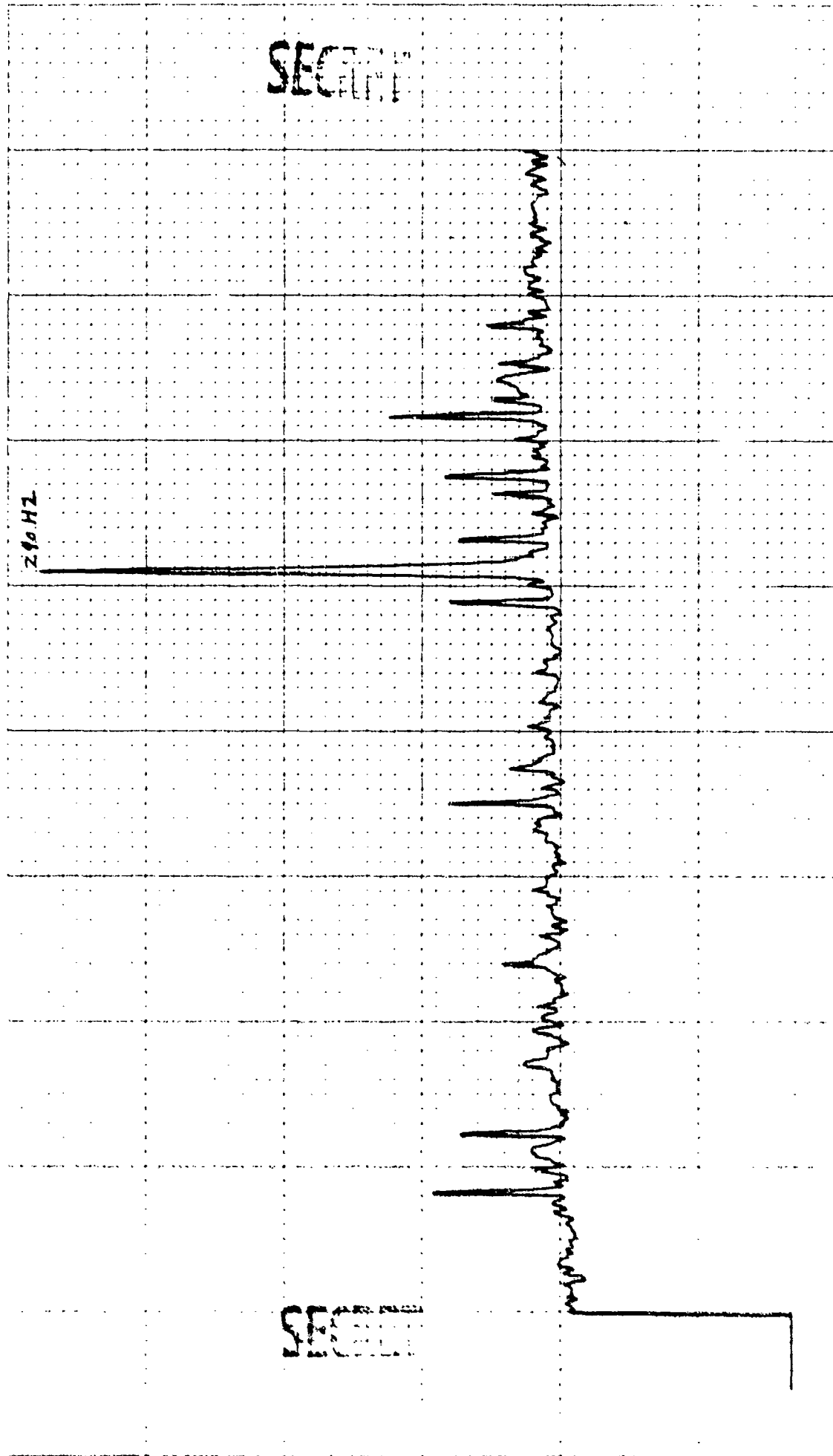
CONTROL: 315 - 1501 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 44 INDEX 3740

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



46 0703

CONTROL: 3-15-1501 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

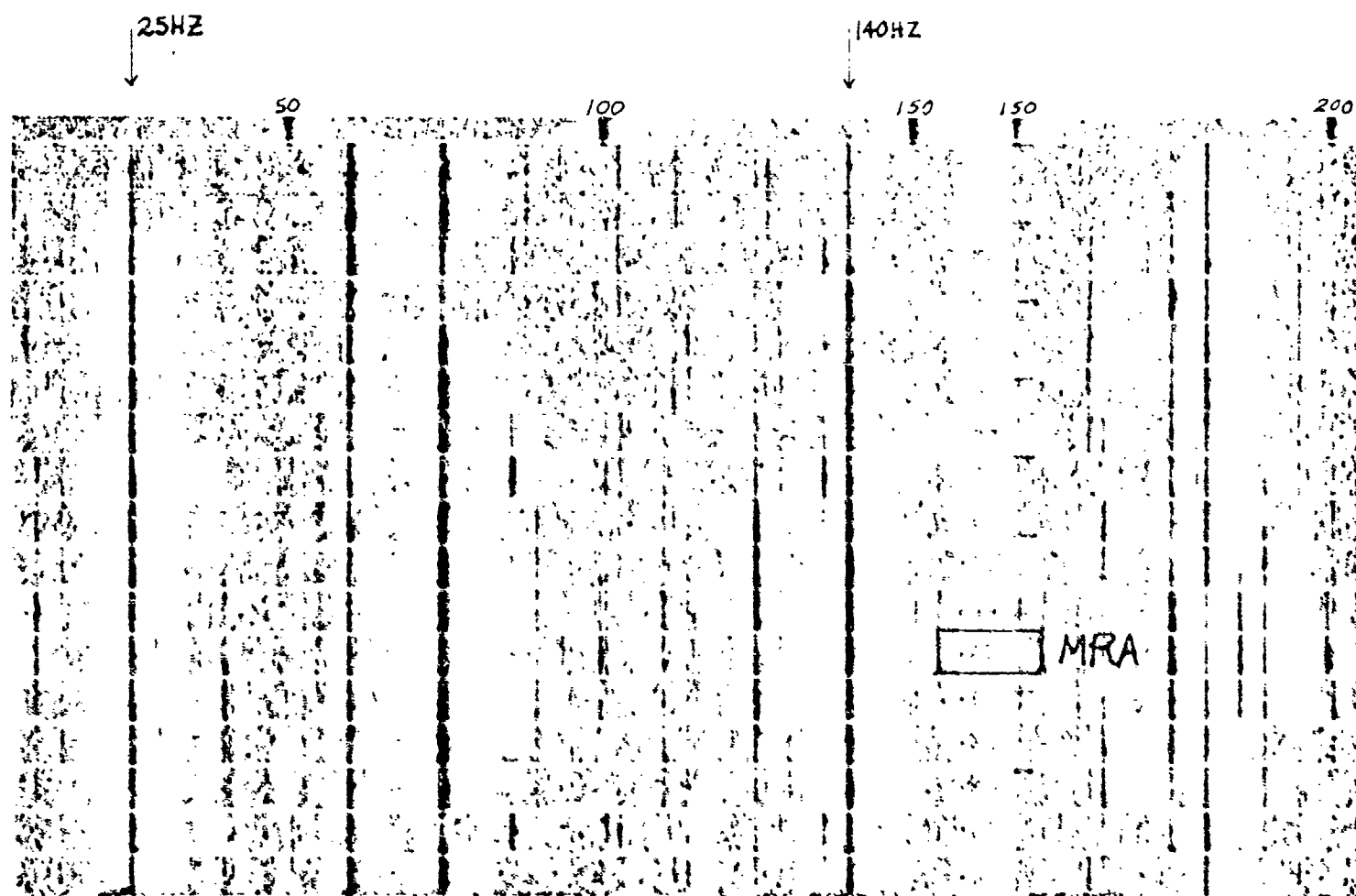
REEL: 114 INDEX: 3740

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING

290 HZ

SECRET

SECRET



CONTROL NUMBER 100-2-4-1-1-1-1
 NUMBER OF ELEMENTS 1
 FREQUENCY BAND 25 TO 140 HZ
 RANGE 25 N.M.

HISTORICAL
 TAPE REEL NUMBER 100

ANALYSIS BAND WIDTH 25 HZ
 WATER DEPTH 2 FMS

FILED
 DATE
 ENCL

140HZ

290HZ 295HZ

SECRET

150

150

200

250

300

MRA

HISTORICAL
TAPE REEL NUMBER

ANALYSIS BAND WIDTH
WATER DEPTH

Tape Count

Element Numbers

DATE

EXERCISE: HEARING STYLE

SECRET

SAN-XXX-78-0138

TIME
DATE
SOURCE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-22.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-12.1</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>+5.9</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>+6.1</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-61.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-51.6</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-33.6</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.9</u>	
SIGNAL LEVEL FOR SNR	<u>-33.6</u>	<u>39.5</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>35.5</u>	
MRA CORRECTION	<u>+ .2</u>	<u>35.7</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>27.5</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-21.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-11.8	
BEAMFORMER GAIN	<u>+18</u>	+6.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+7.0	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.6	
BEAMFORMER GAIN	<u>+18</u>	-45.6	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+6.2</u>	
SIGNAL LEVEL FOR SNR	<u>-45.6</u>	51.8	
PROCESSOR CORRECTION	<u>-4.0</u>	47.8	
MRA CORRECTION	<u>+ .8</u>	48.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	40.4	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-58.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-48.8</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-30.8</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>- 30</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-67.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-57.7</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-39.7</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-30.8</u>	
SIGNAL LEVEL FOR SNR	<u>-39.7</u>	<u>8.9</u>	
PROCESSOR CORRECTION	<u>- 4.4</u>	<u>4.5</u>	
MRA CORRECTION	<u>+ .8</u>	<u>5.3</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>-2.9</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT

8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u></u>
MRA SIGNAL LEVEL	<u>+6.1</u>	<u>+7.0</u>	<u>-30.0</u>
ARRAY SIGNAL GAIN	<u>25.5</u>	<u>22.2</u>	<u></u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u></u>
# of elements			
DIFFERENCE	<u>+1.5</u>	<u>-1.8</u>	<u></u>

ARRAY GAIN

MRA SNR	<u>35.7</u>	<u>40.6</u>	<u>5.3</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u></u>
ARRAY GAIN	<u>6.3</u>	<u>13.2</u>	<u></u>
THEORETICAL VERTICAL GAIN	<u>10.4</u>	<u>12.1</u>	<u>12.3</u>
(at MRA)	<u>-4.1</u>	<u>+1.1</u>	<u></u>
DIFFERENCE	<u></u>	<u></u>	<u></u>

CONFIDENTIAL

1408 10.00 TO THE 1000 Hz. 10.00 Hz.

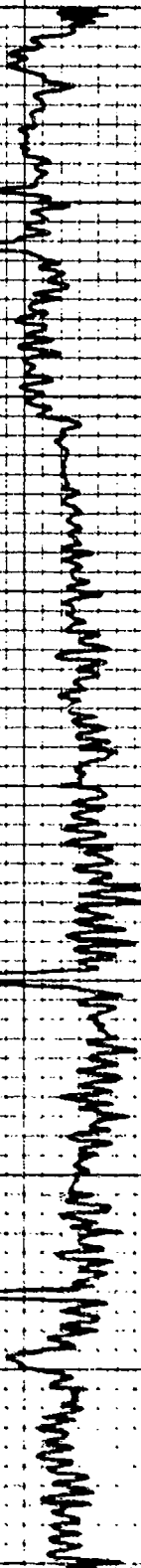
46 0703

CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 29-44 REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77-1501 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +7 DEG. AZ STEERING

SECRET

SECRET

1500 HZ



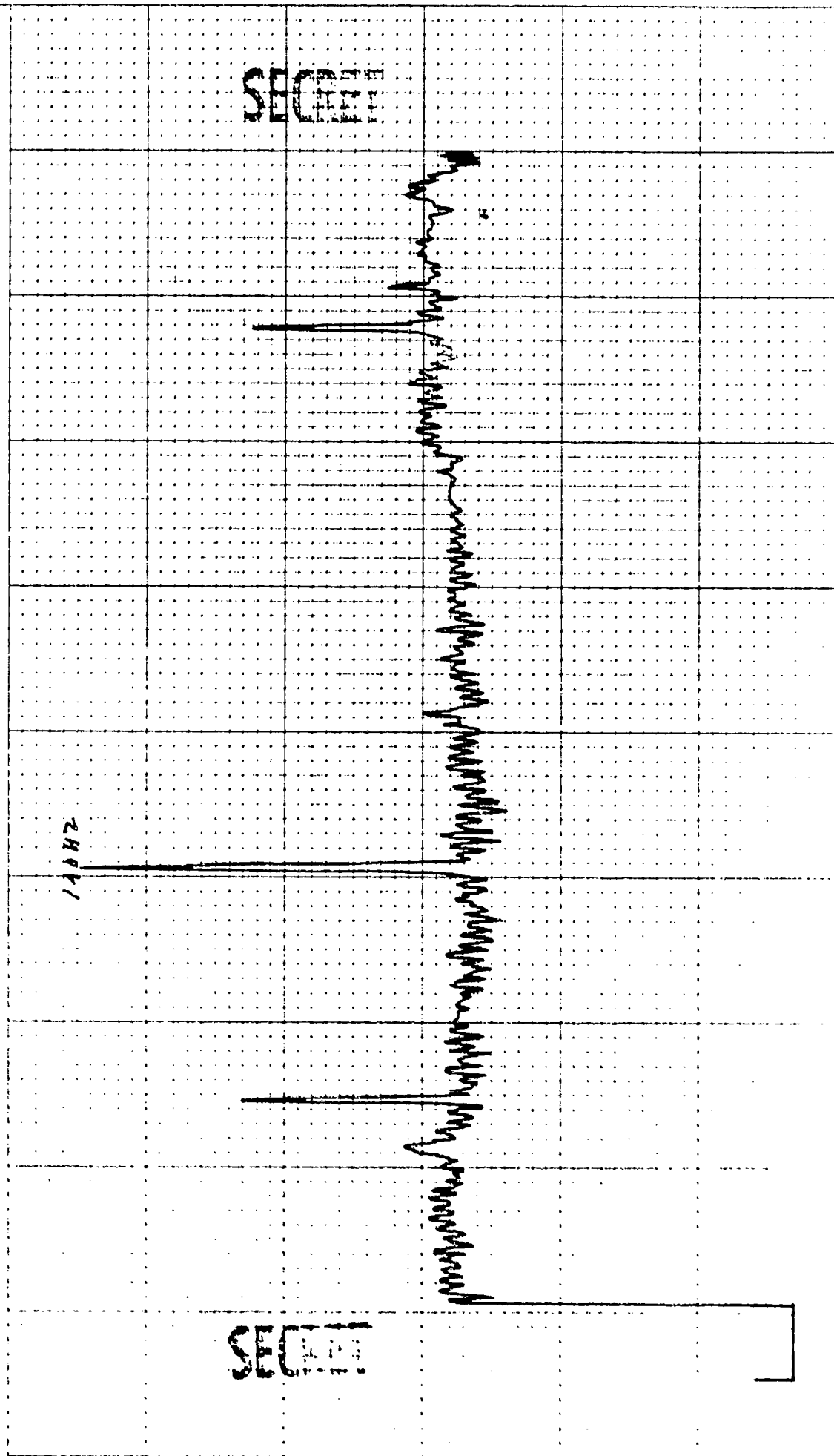
46 0703

CONTROL: 1501 - 16 (DBB)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 28-04)
DATE/TIME: 3-15-77 1501 Z
ANALYSIS BANDWIDTH: 11/10.12
+9 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
FILTFR
ATTN: -10 DB
WTG: HANNING

REEL: 114 INDE X 3000



1400 15 000 100 000 100 000

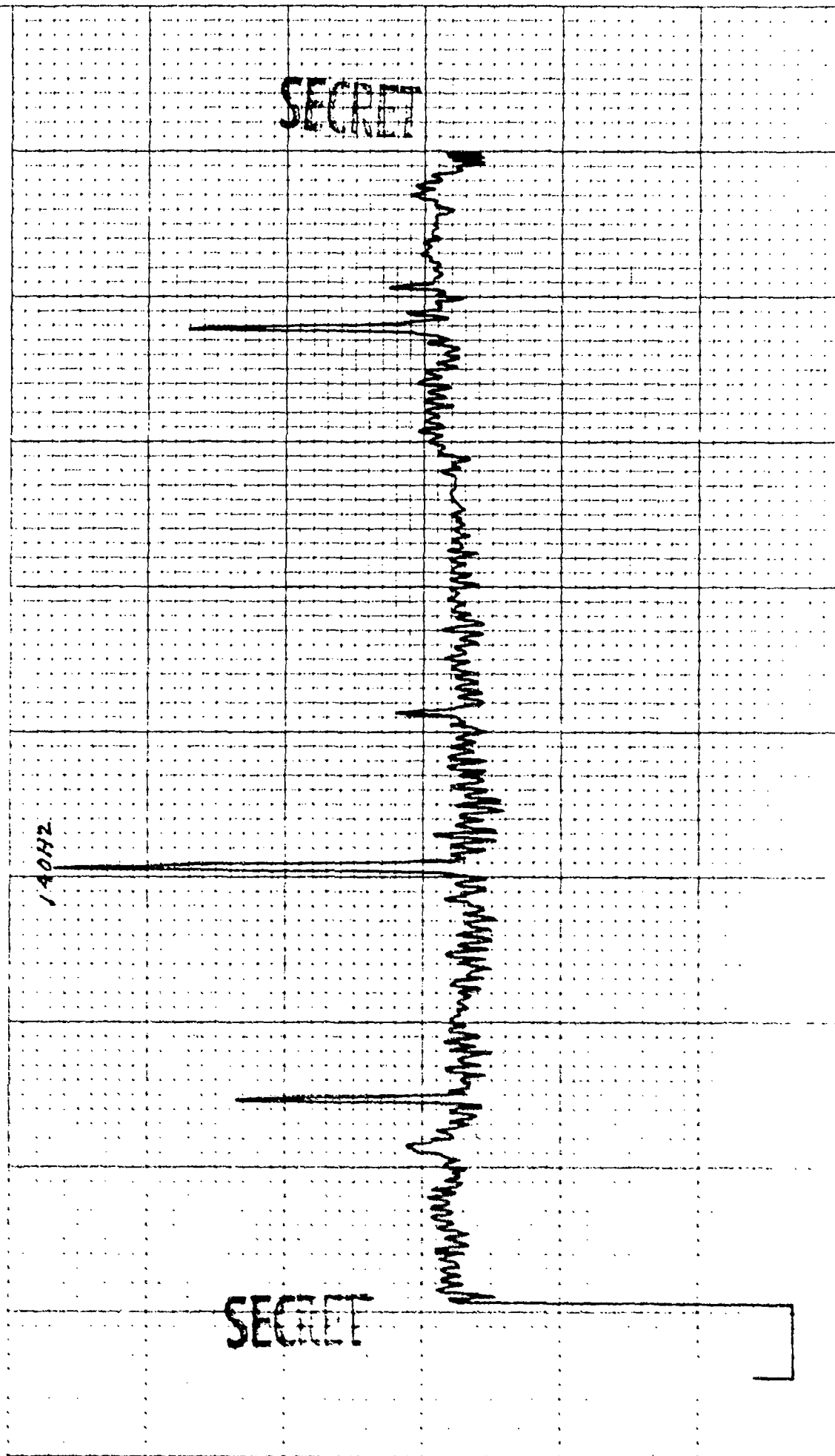
46 0703

CONTROL: 1501 - 16 (DPB)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
4/1 DEG. AZ STEERING

REEL: 114 INDE X 3000

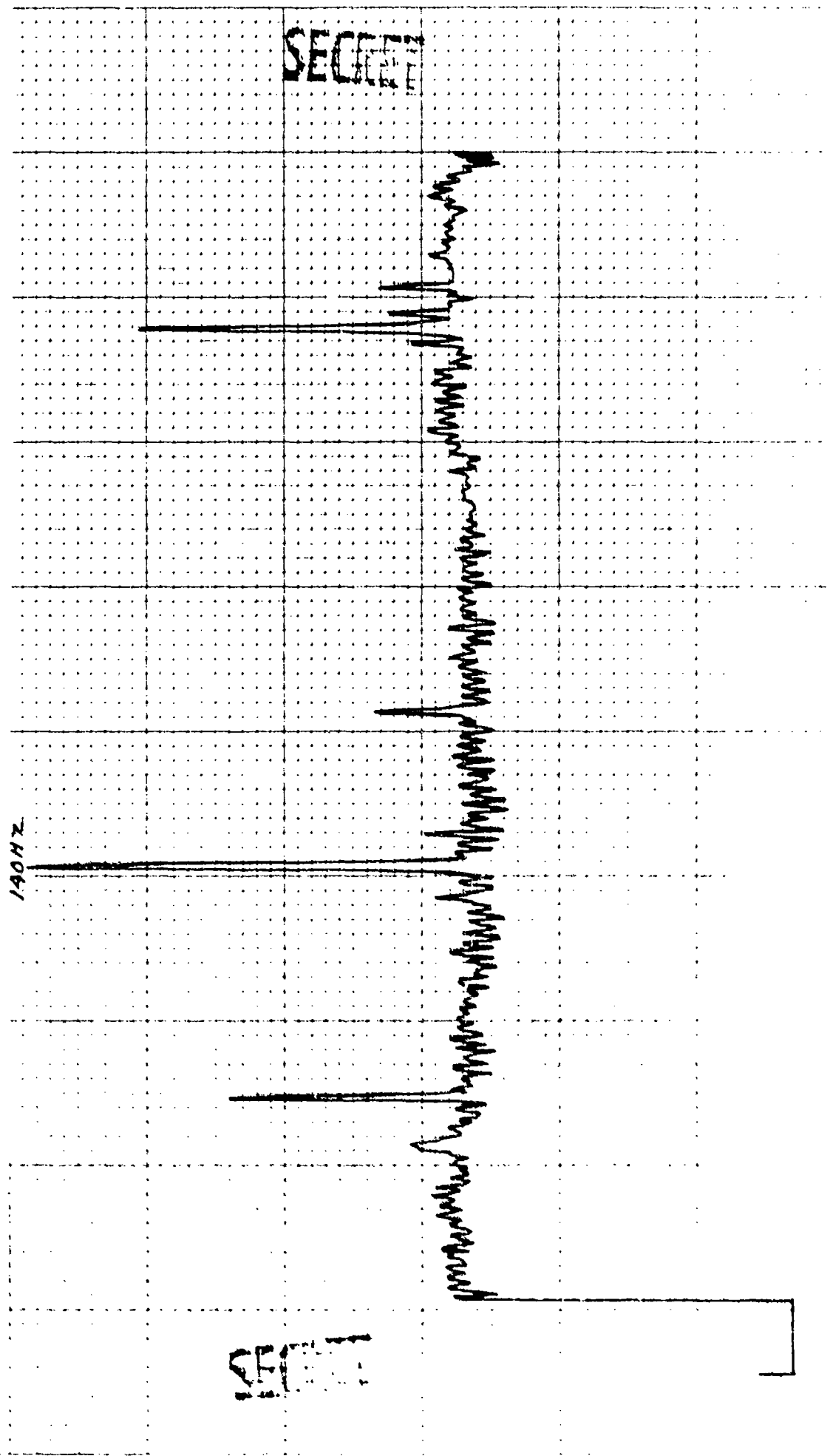
INTEGRATION TIME 320 SECS
ATTN: -18 DB
FILTR WTG: HANNING



46 0703

REF 24 000 000000 0000 0000

CONTROL: 1501 - 40 (DB) DATE OF ANALYSIS: 29-49 REEL: 114 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-72 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ 13 DEC. AZ STEERING



46 0703

REEL: 144 INDEX X 3000
INTEGRATION TIME 320 SECS ATTN: 70 DB
FILTER WTC: HANNING

DATE OF ANALYSIS: - - - - -
28-44)
DATE/TIME: 3-5-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
4/5 DEG. AZ STEERING

REEL: 104
320 SECS
FIL. TER

INDEX 3000
ATTN: 78 DB
WTC: HANNING

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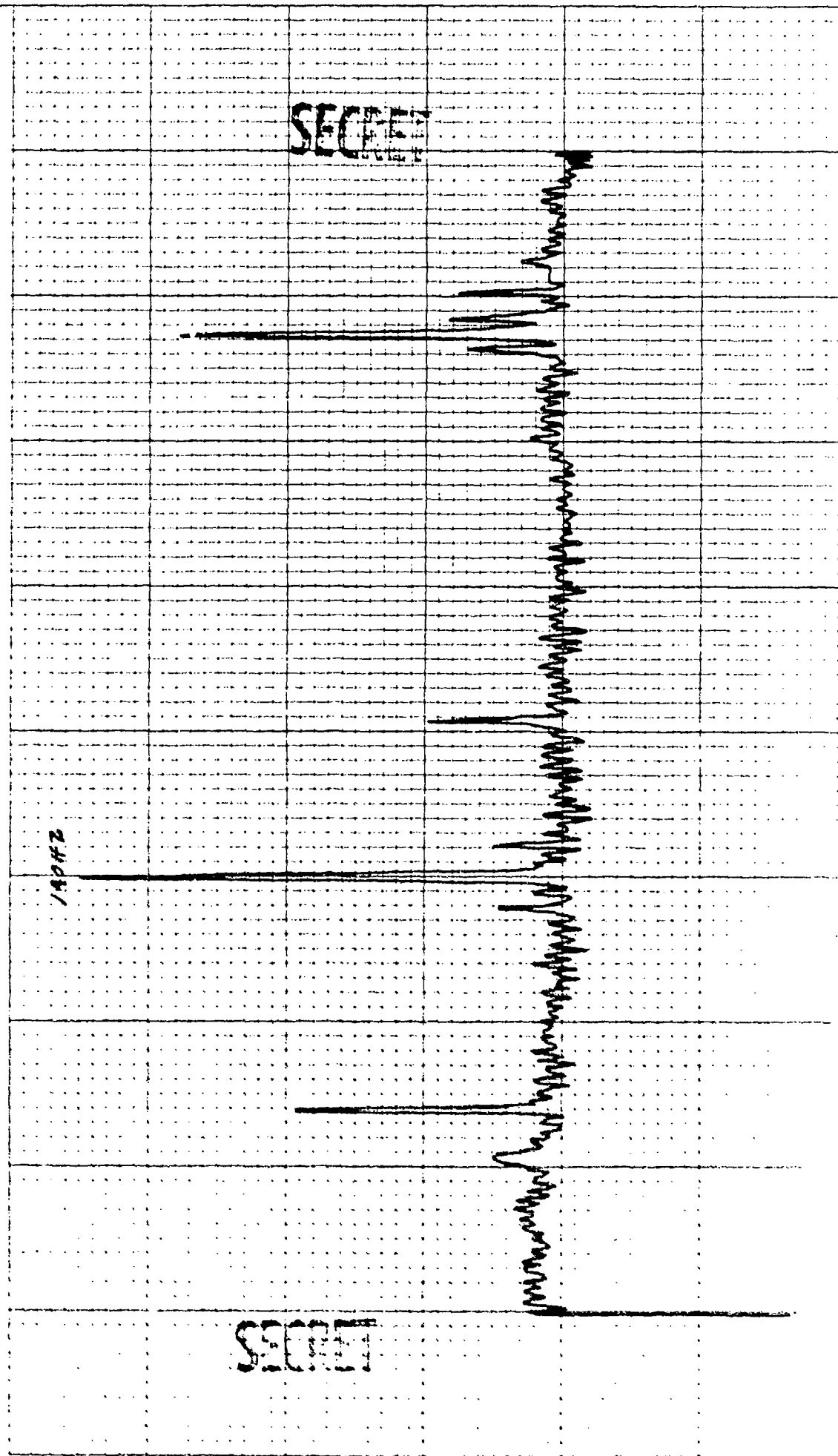
46 0703

CONTROL: 1501 - 16 (200)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 17 DEG. AZ STEERING

REEL: 114
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
WTG: HANNING

INDE X 3000



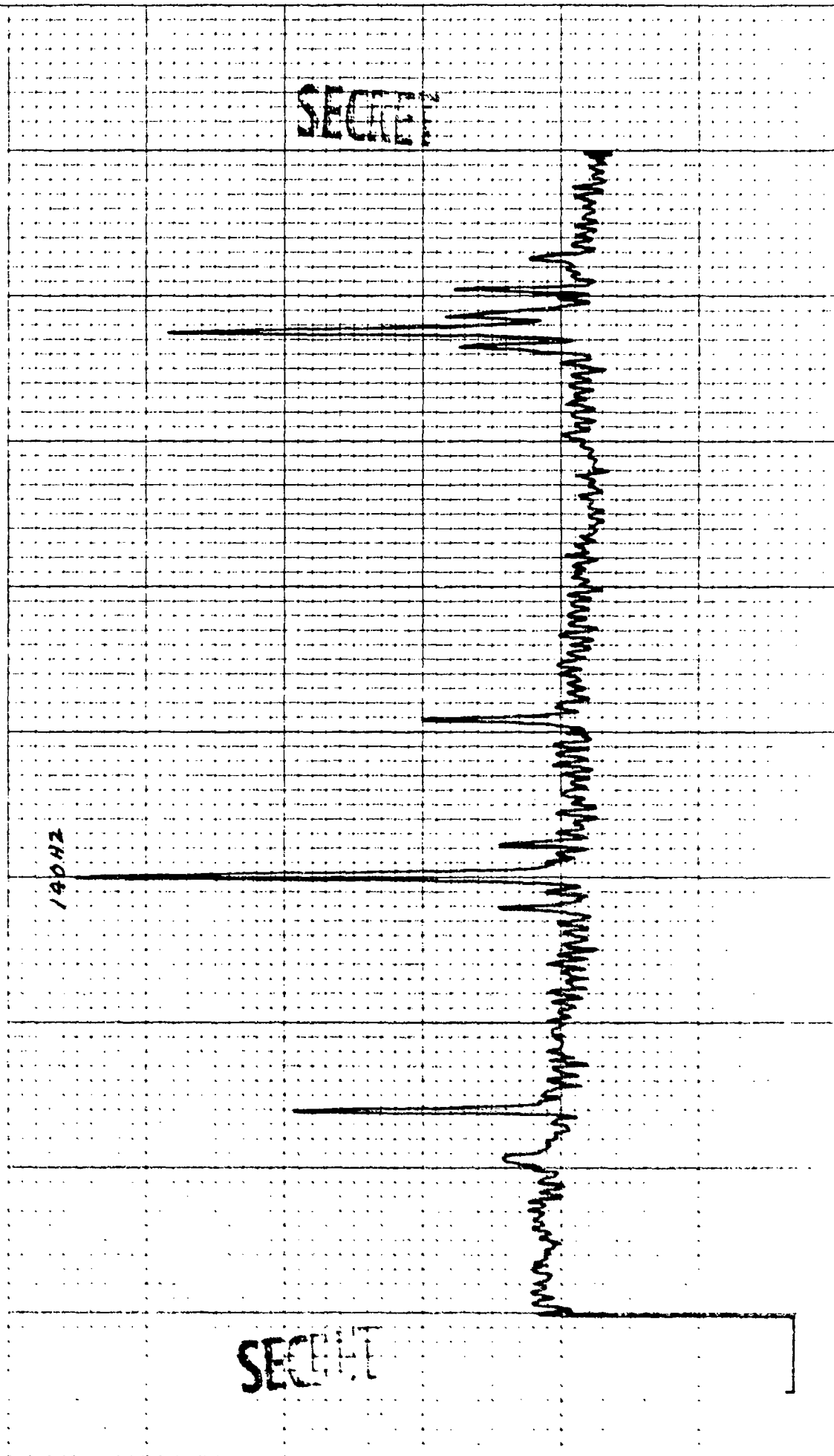
REF: 15-16 TO THE BOMB: 15-16

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CONTROL: 1501 - 16 (DDB)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 19 DEG. AZ STEERING

REEL: 44
INTEGRATION TIME 320 SECS
FII.TFR
ATTEN: 78 DB
WTG: HANNING
INDE X 3000



46 0703

CONTROL: 1501 - 16 (000)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

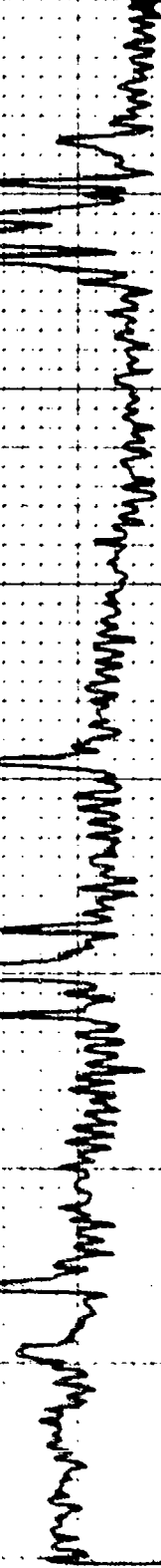
DATE OF ANALYSIS: 28-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

REEL: M4 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING

140 HZ

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CONTROL: 1501 - 16 (DPP) REEL: 44 INDEX X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 29-44 - -
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1500 Z INTEGRATION TIME 320 SECS ATTN: 76 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTFR WTG: HANNING
16 ELEMENTS +2/ DEG. AZ STEERING

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CONTROL: 1501 - 16 (DPS) REEL: M4 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
DATE OF ANALYSIS: 29-44
DATE/TIME: 3-5-73 - 1501 Z
INTEGRATION TIME 320 SECS
ANALYSIS BANDWIDTH: 1/10HZ
ATTN: -10 DB
* 23 DEG. AZ STEERING
FILTFR
WTG: HANNING

150 HZ

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CONTROL: 1501-16 (DP2) DATE OF ANALYSIS: 29-44 REEL: 44 INDEX: 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-5-77-1501 2 INTEGRATION TIME 320 SECS ATTEN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTERED WTG: HANNING
CENTER FREQ: 150 HZ 16 ELEMENTS LEG. AZ STEERING

140HZ

SECRET

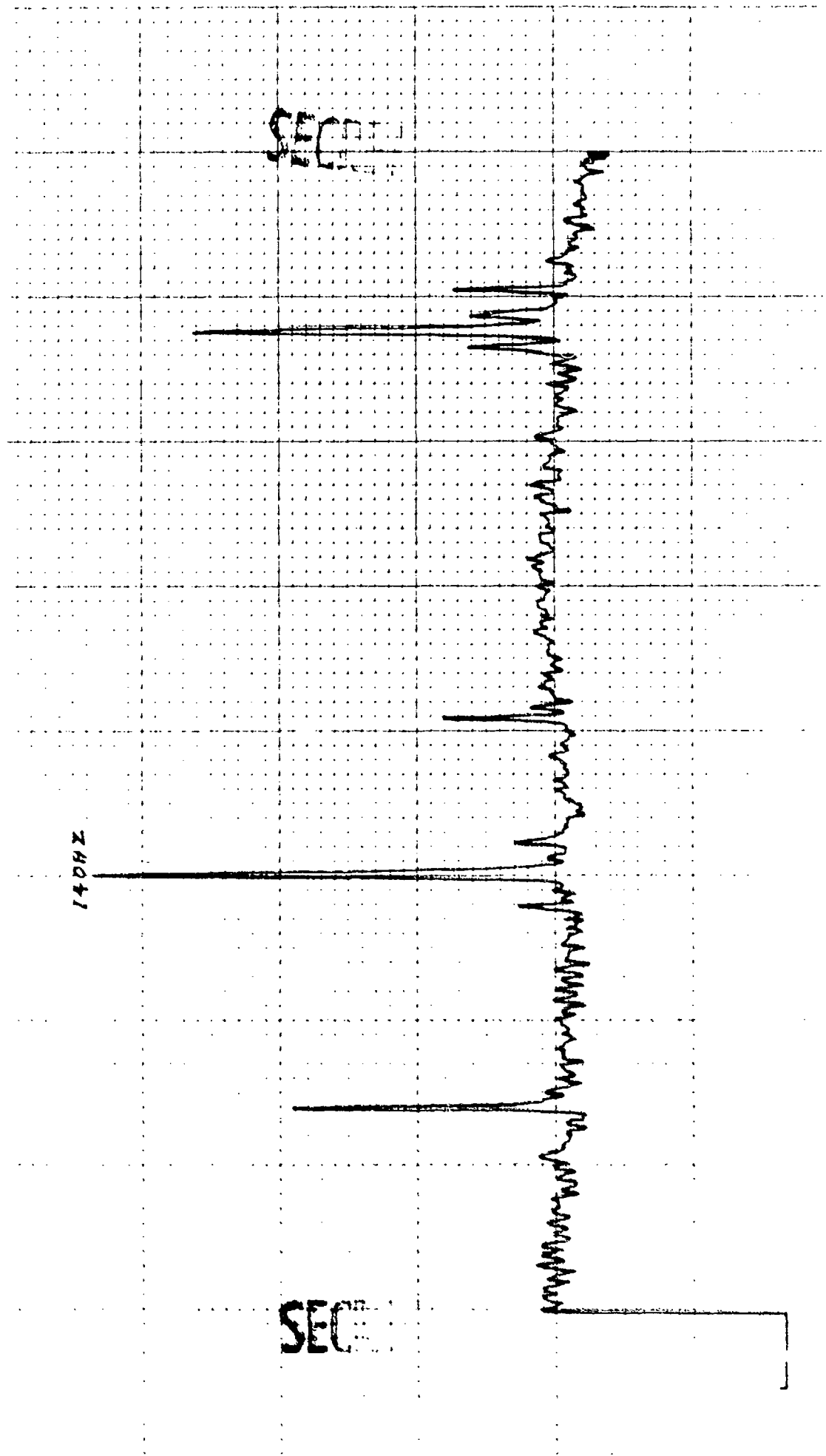
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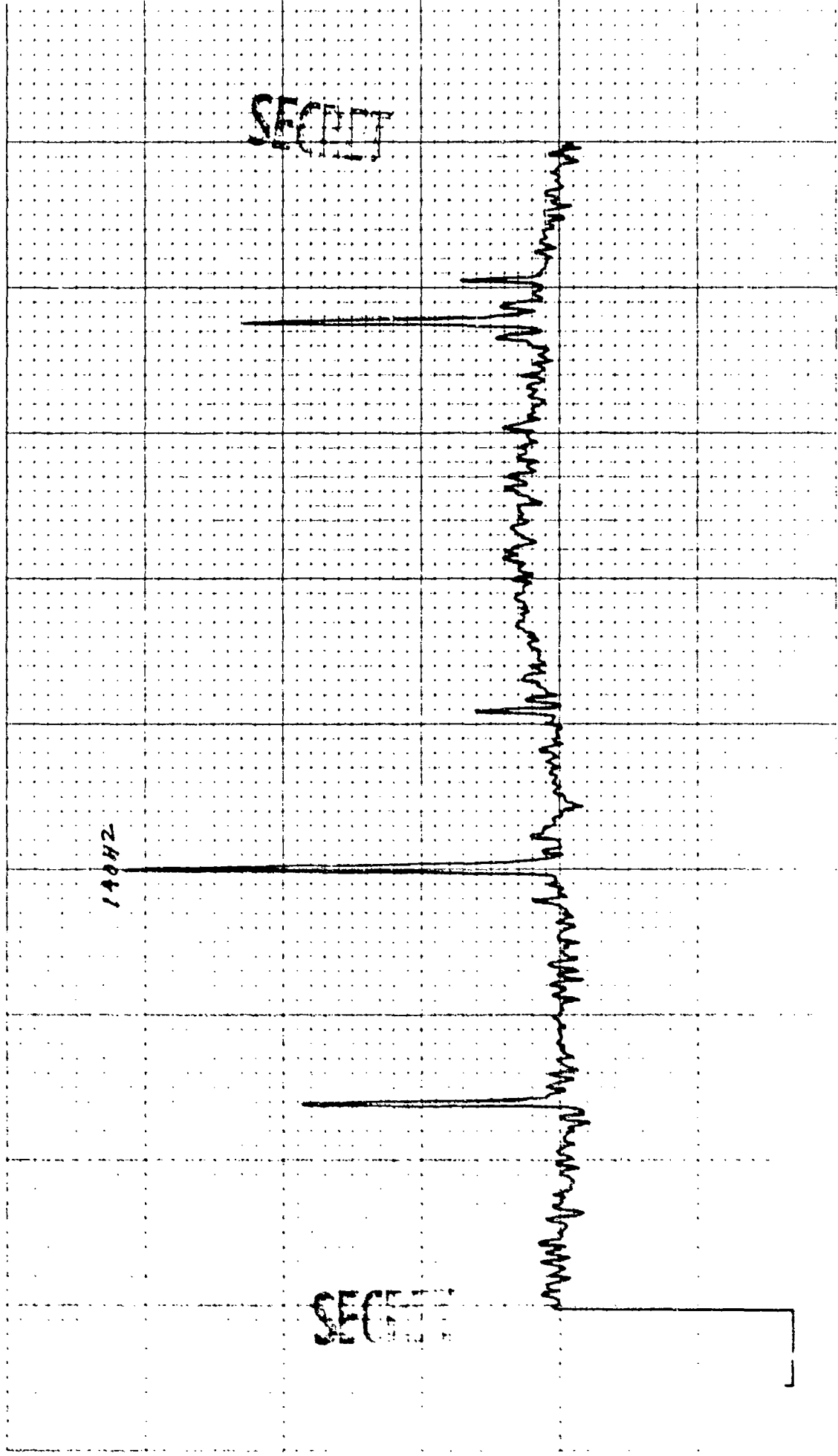
CONTROL: 1501 - 16 (DPB) REEL: 164 INDE X 3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 29-44
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +27 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING



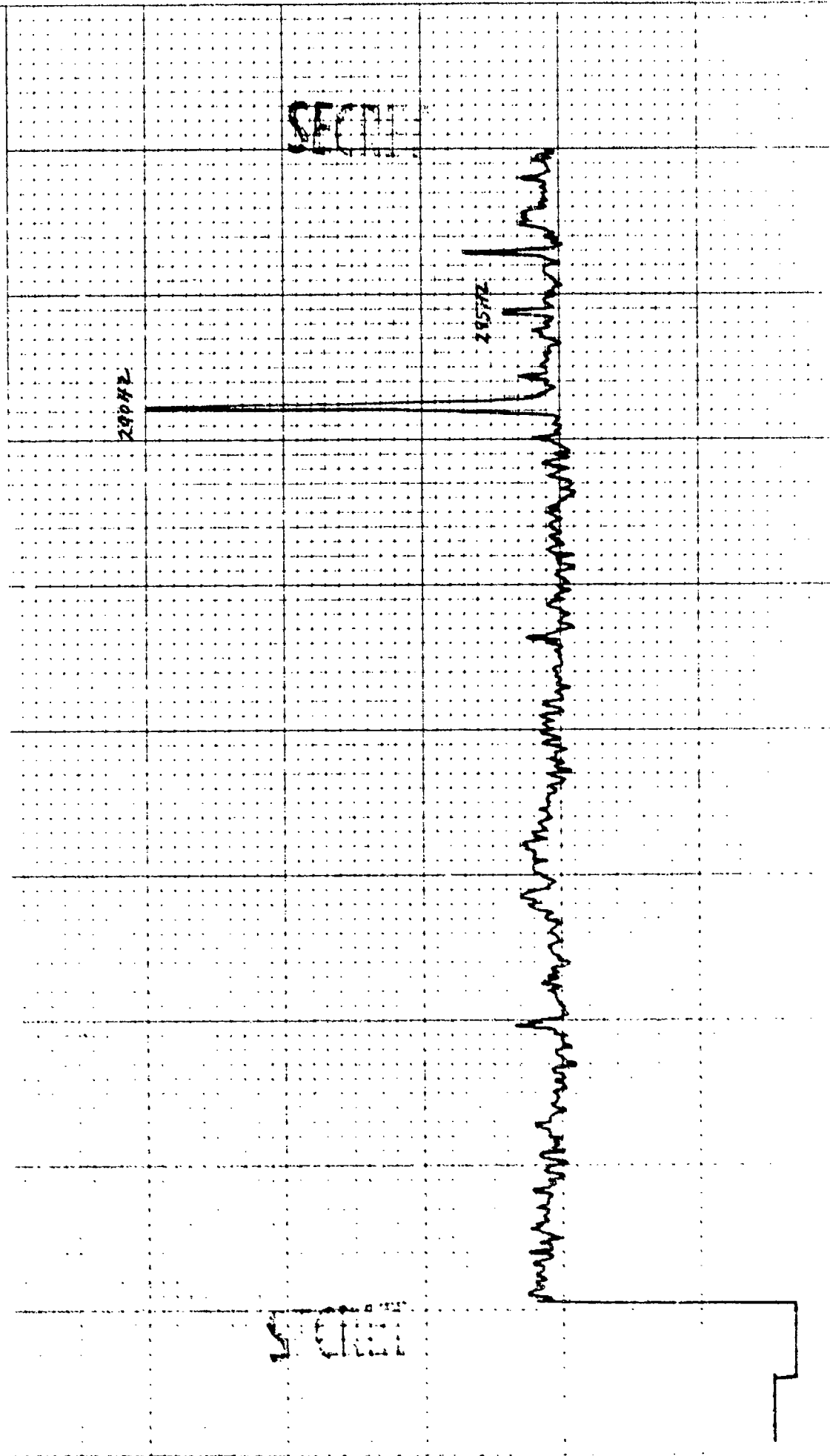
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CONTROL: 1501 - 16 (DPR) REEL: 144 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: -- -- --
EXERCISE: BEARING STAKE 28-44)
CENTER FREQ: 150 HZ DATE/TIME: 3-5-77 - 1501 Z
16 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
+29 DEG. AZ STEERING



46 0703

CONTROL: 1501 - 16 (DPP) REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: 70 DB
CENTER FREQ: 280 HZ FILTER WTG: HANNING
16 ELEMENTS
DATE OF ANALYSIS: 89-44
DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+7 DEG. AZ STEERING



12-1 2000 1000 1000 1000

46 0703

CONTROL: 1501 - 16 (D08)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 170 KHZ

16 ELEMENTS

DATE OF ANALYSIS: 29-44

DATE/TIME: 3-5-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10HZ
+9 DEG. AZ STEERING

REEL: H4

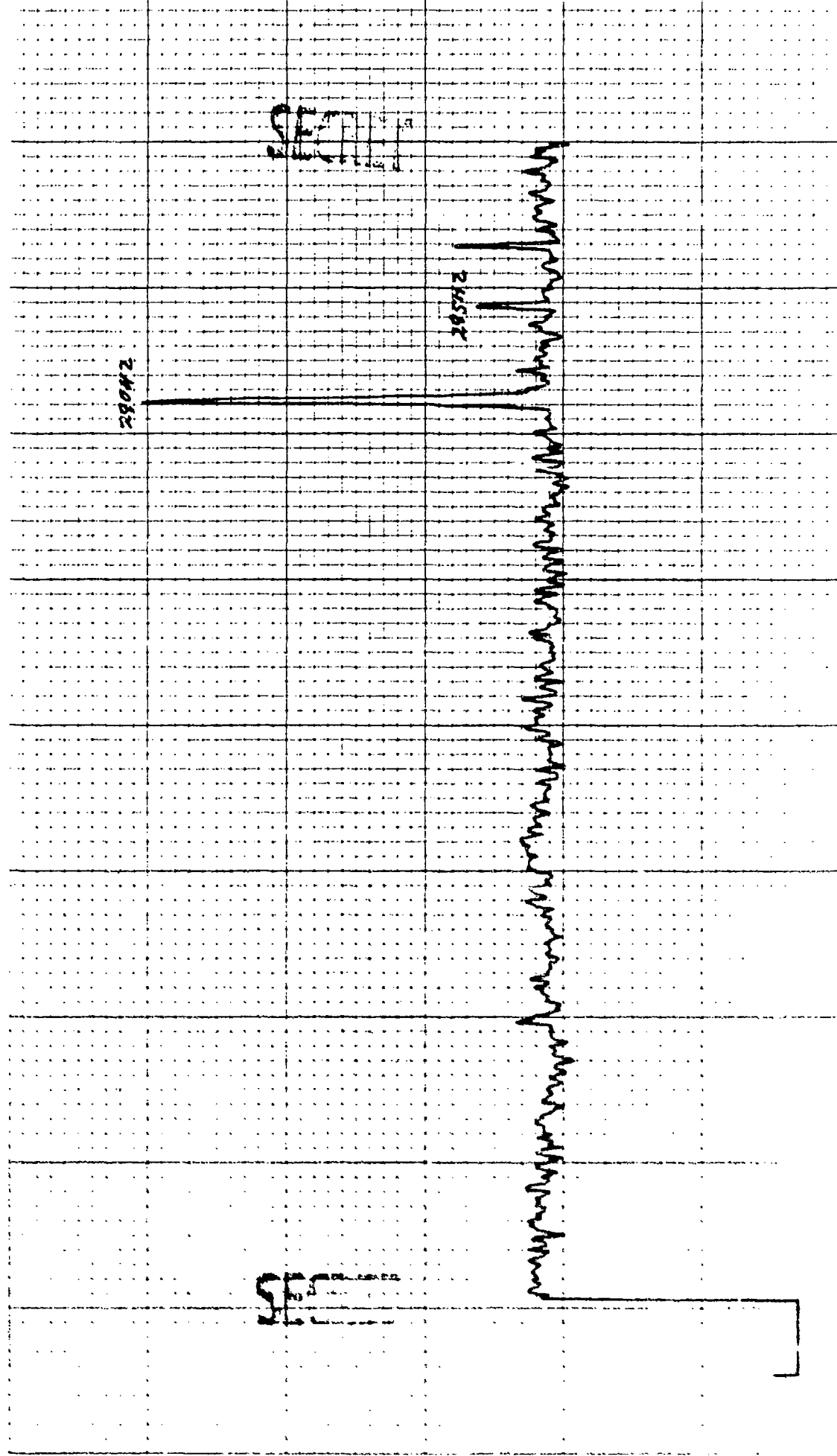
INTEGRATION TIME 320 SECS

FILTER

INDE X3000

ATTEN: 78 DB

WTG: HANNING

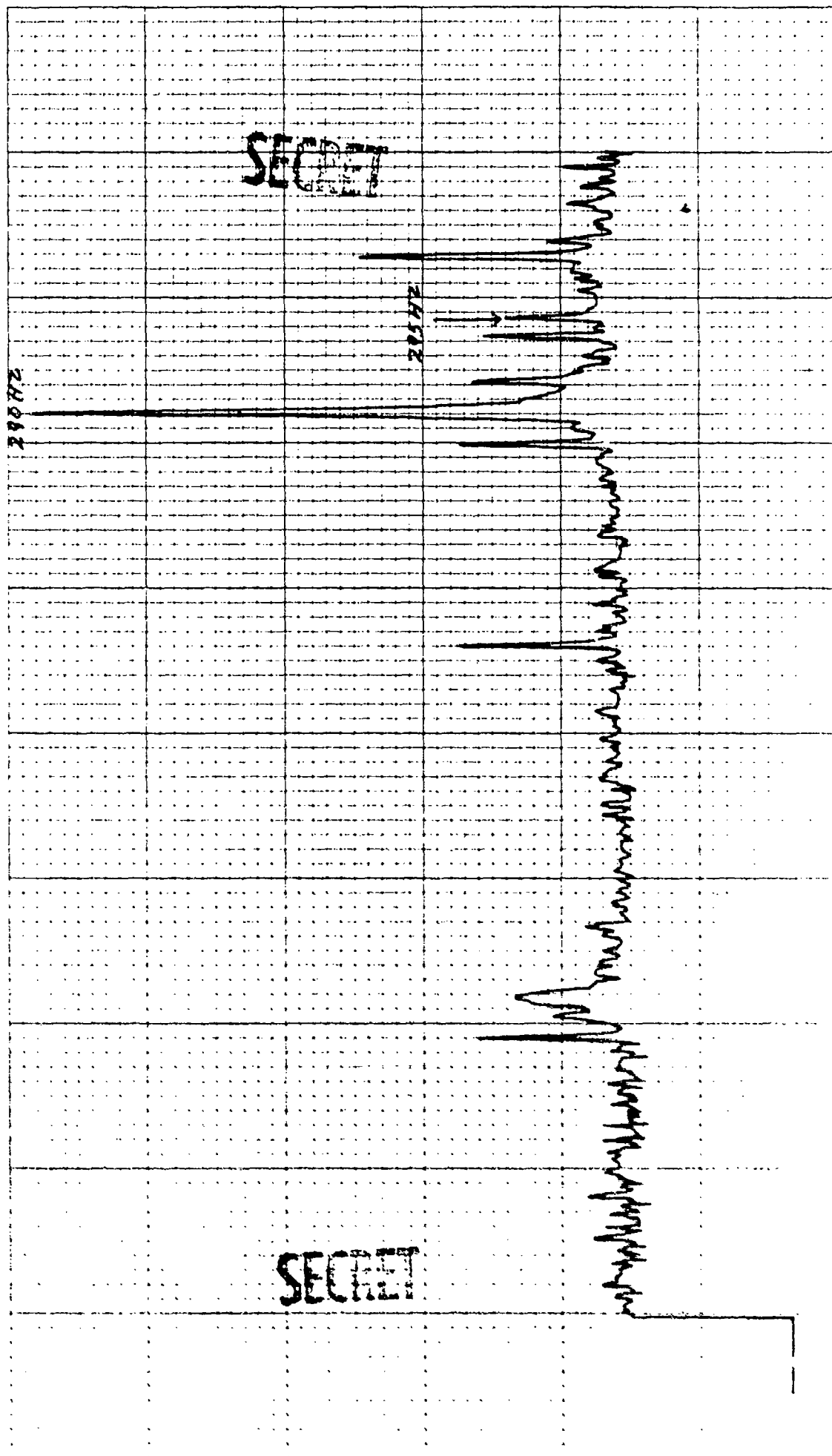


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1000 0000 0000 0000 0000 0000

CONTROL: 1501 - 48 (0000) REEL: M4 INDE XC2000
REARMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 29-44
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77-1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
1/2 ELEMENTS + 11 DEG. AZ STEERING

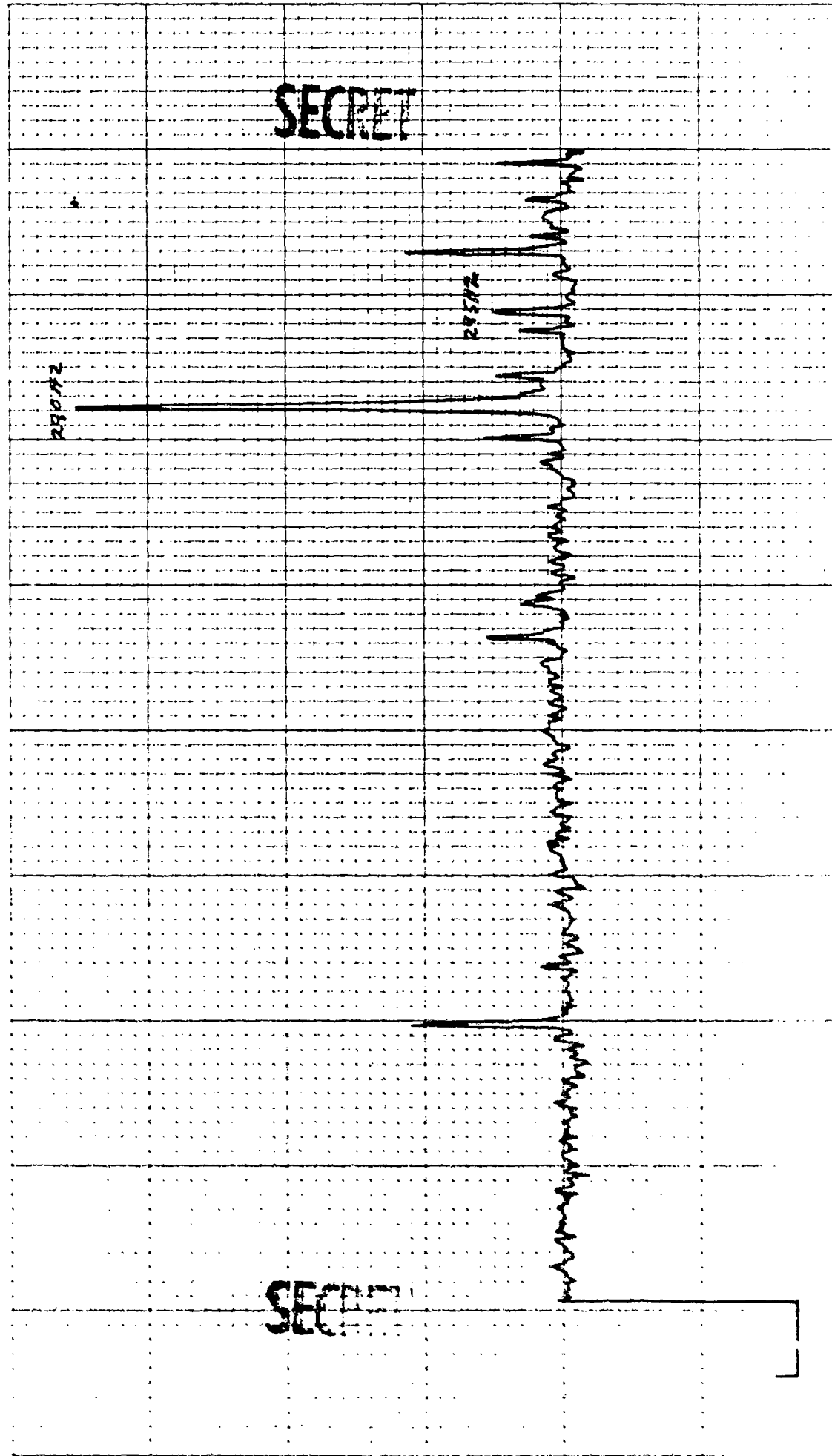
INTEGRATION TIME 320 SECS
ATTEN: 18 DB
FILTER
WTG: HANNING



46 0703

REF ID: A60000

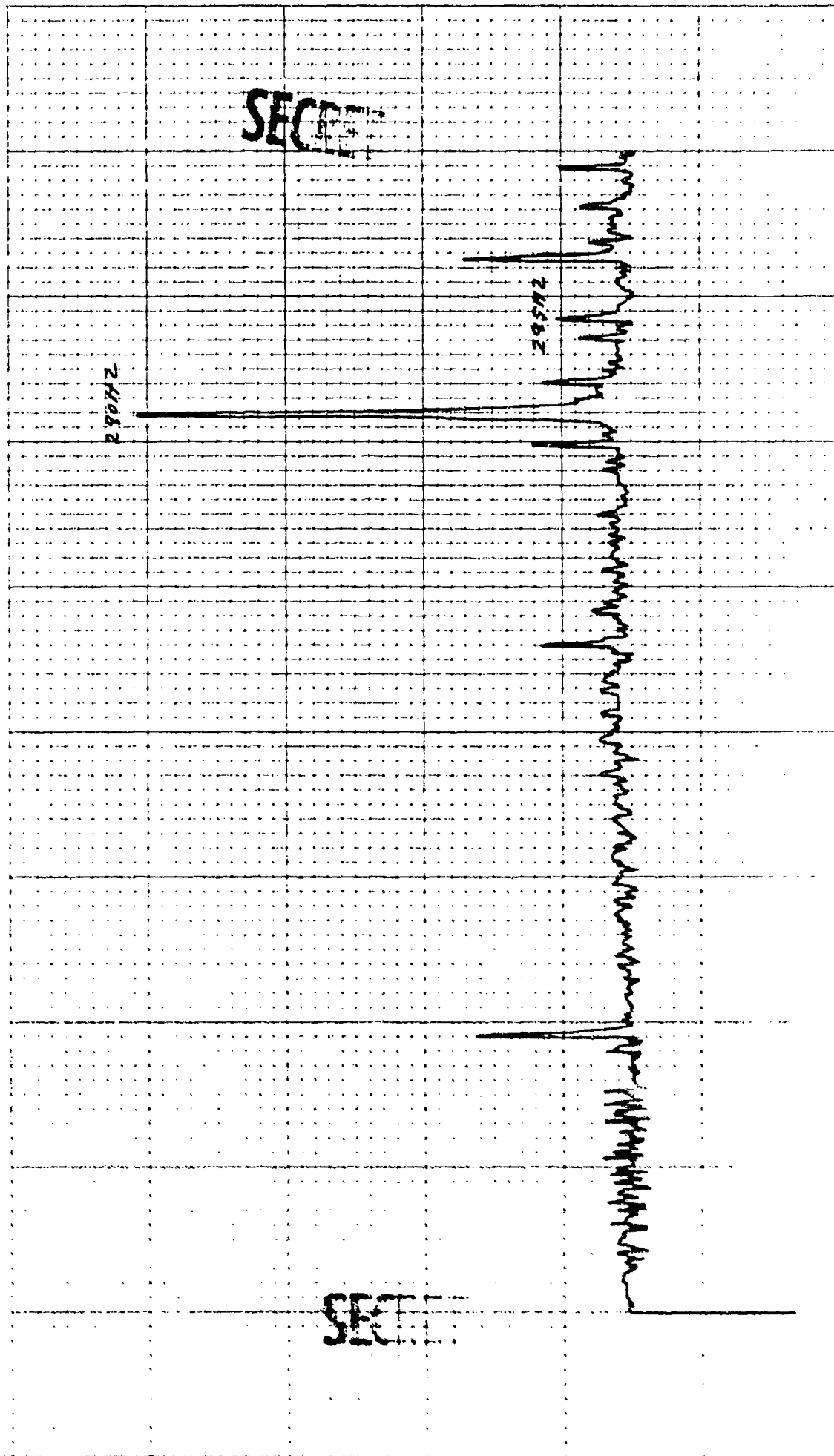
CONTROL: 1501 - 16 (DP2) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM(ELEMENTS) 29-44
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS REEL: 144 INDEX X 3000
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ ATTEN: -10 DB
/C ELEMENTS + 13 DEG. A2 STEERING FILTER WTG: HANNING



46 0703

REF 5410 TO THE DEPT. OF DEFENSE

CONTROL: 1501 - 16 (DPS) DATE OF ANALYSIS: 29-44 REEL: 19 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-5-72 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ
16 ELEMENTS +15 DEG. AZ STEERING



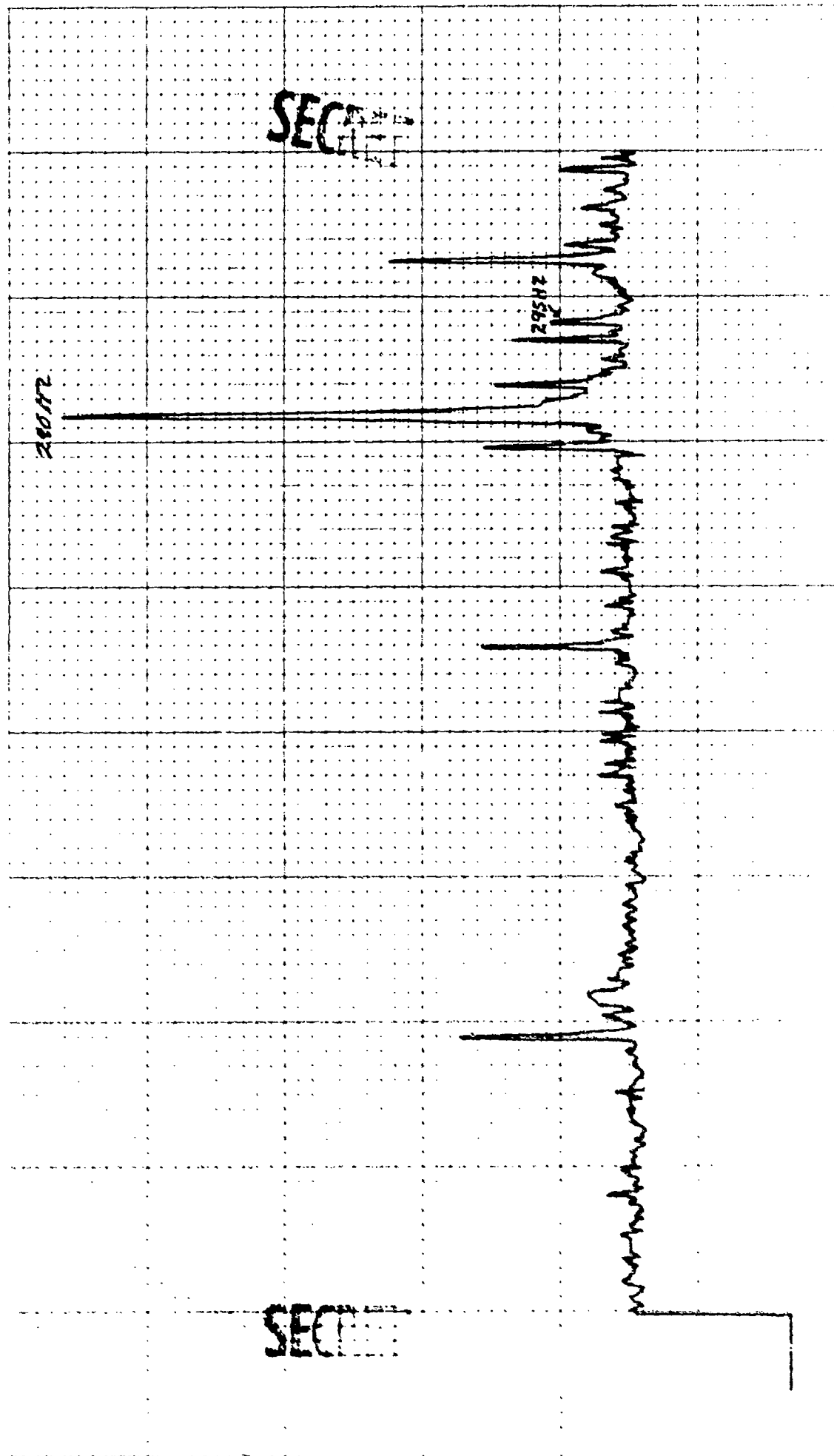
45 0703

CONTROL: 1501 - 16 (200)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-5-77-1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 17 DEG. AZ STEERING

REEL: 44
INTEGRATION TIME 320 SECS
FILL TFR
ATTN: -18 DB
WTC: HANNING

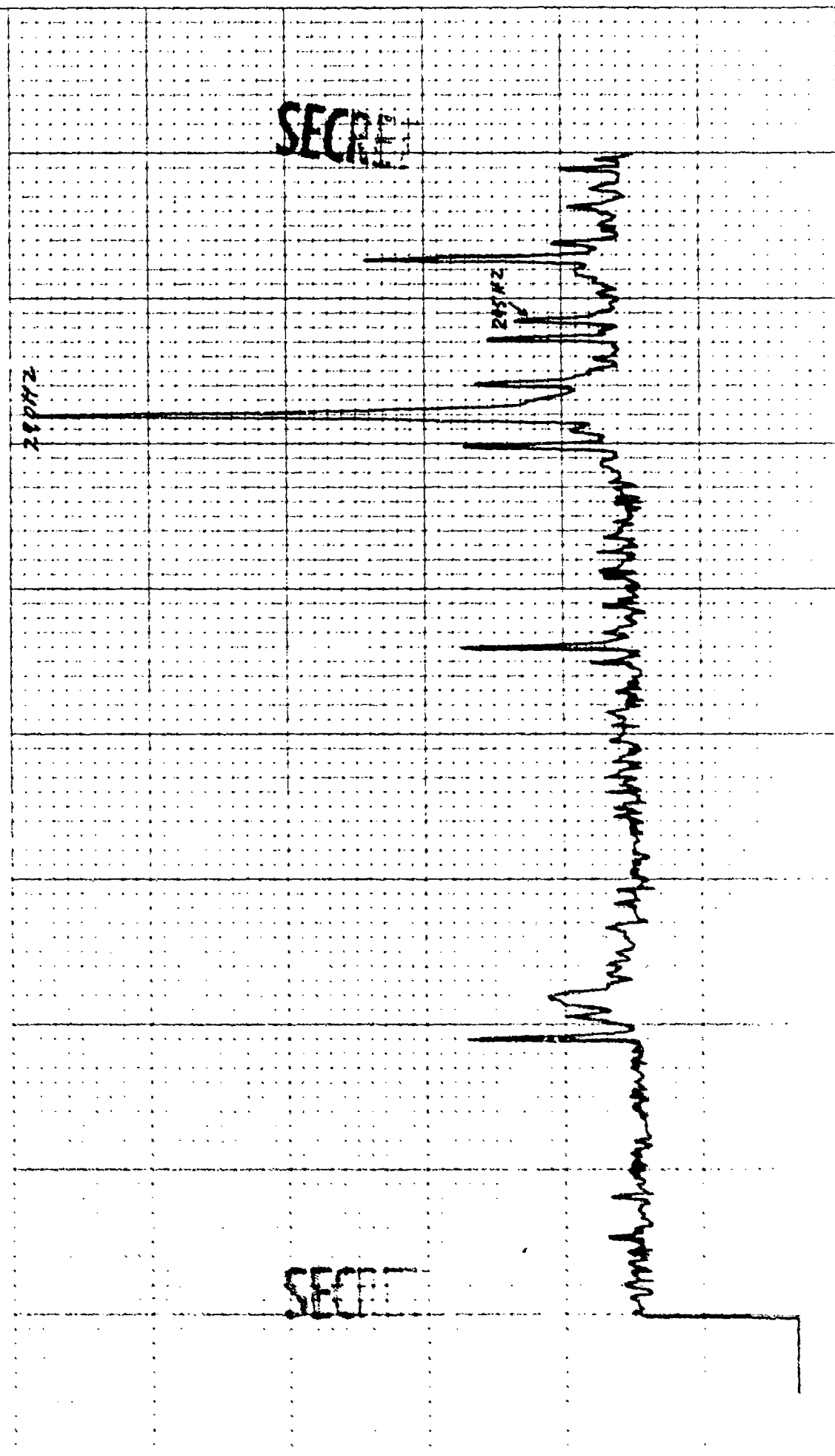
INDE X300



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1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTROL: 1501 - 16 (200) REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 29-44
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS + 19 DEG. AZ STEERING
INTEGRATION TIME 320 SECS ATTEN: 10 DB
FILTFR WTC: HANNING

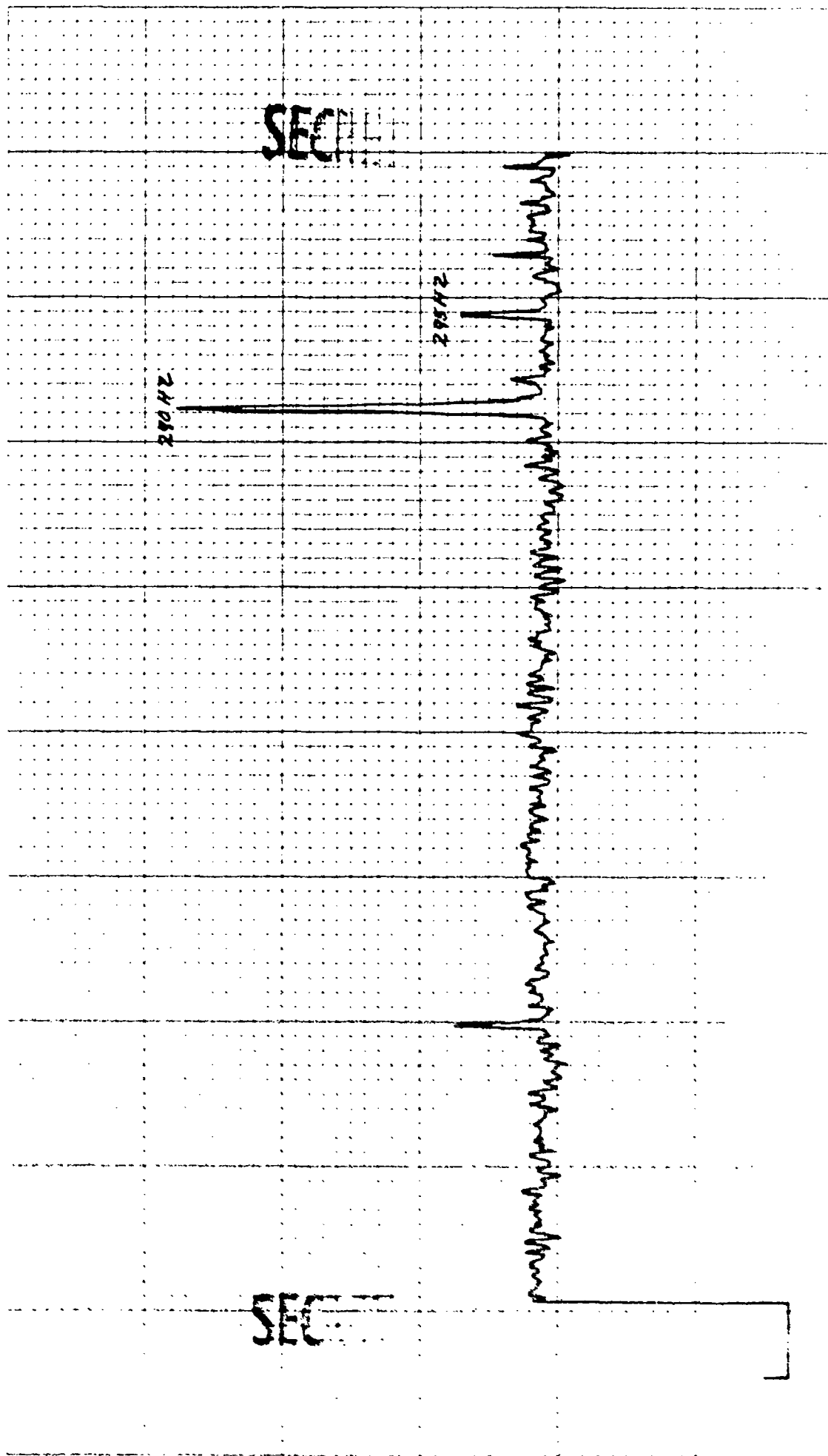


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CONTROL: 1501 - 48 (DPB)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
/6 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

REEL: _____ INDEX X _____
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

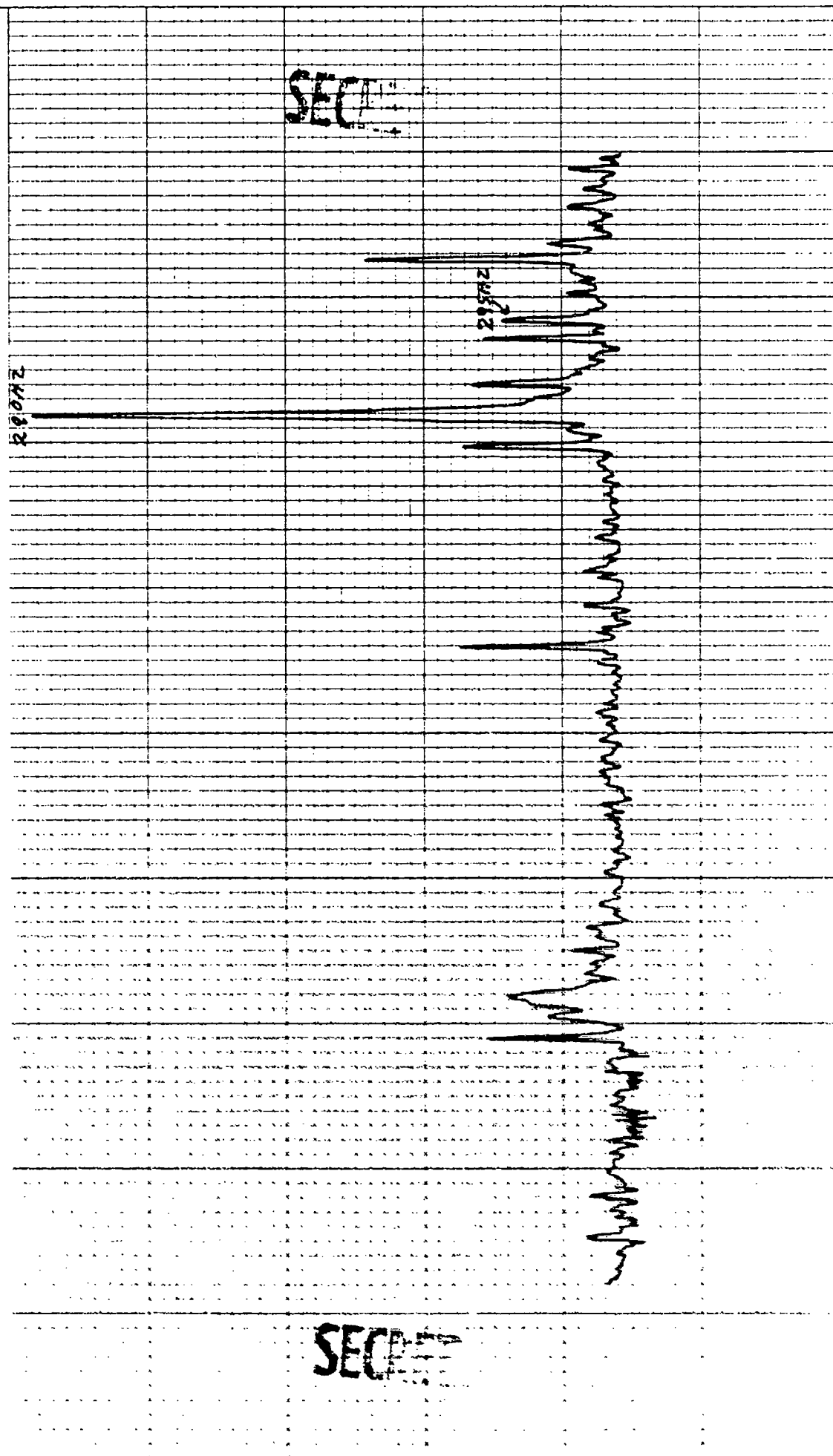


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CONTROL: 1501 - 16 (DP8)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 MZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
28-44)
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 2/ DEG. AZ STEERING

INTEGRATION TIME 320 SECS
FILTFR
WTG: HANNING
ATTN: -18 DB
INDEX X3000
REEL: 114

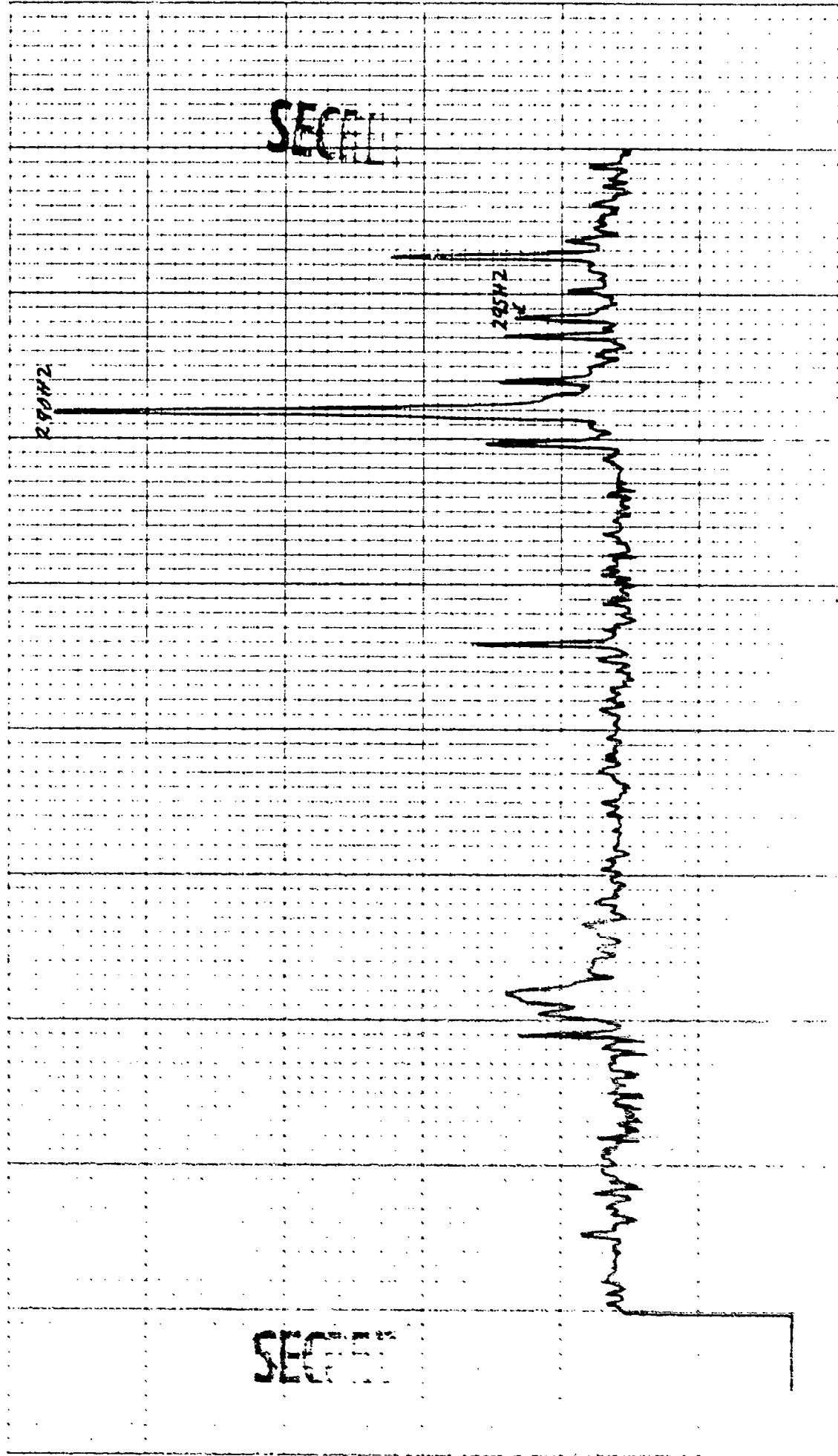


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CONTROL: 1501 - 16 (DPO) REEL: M4 INDEX X 3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 29-44
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS + 23 DEC. AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: 70 DB
FILTER WTG: HANNING

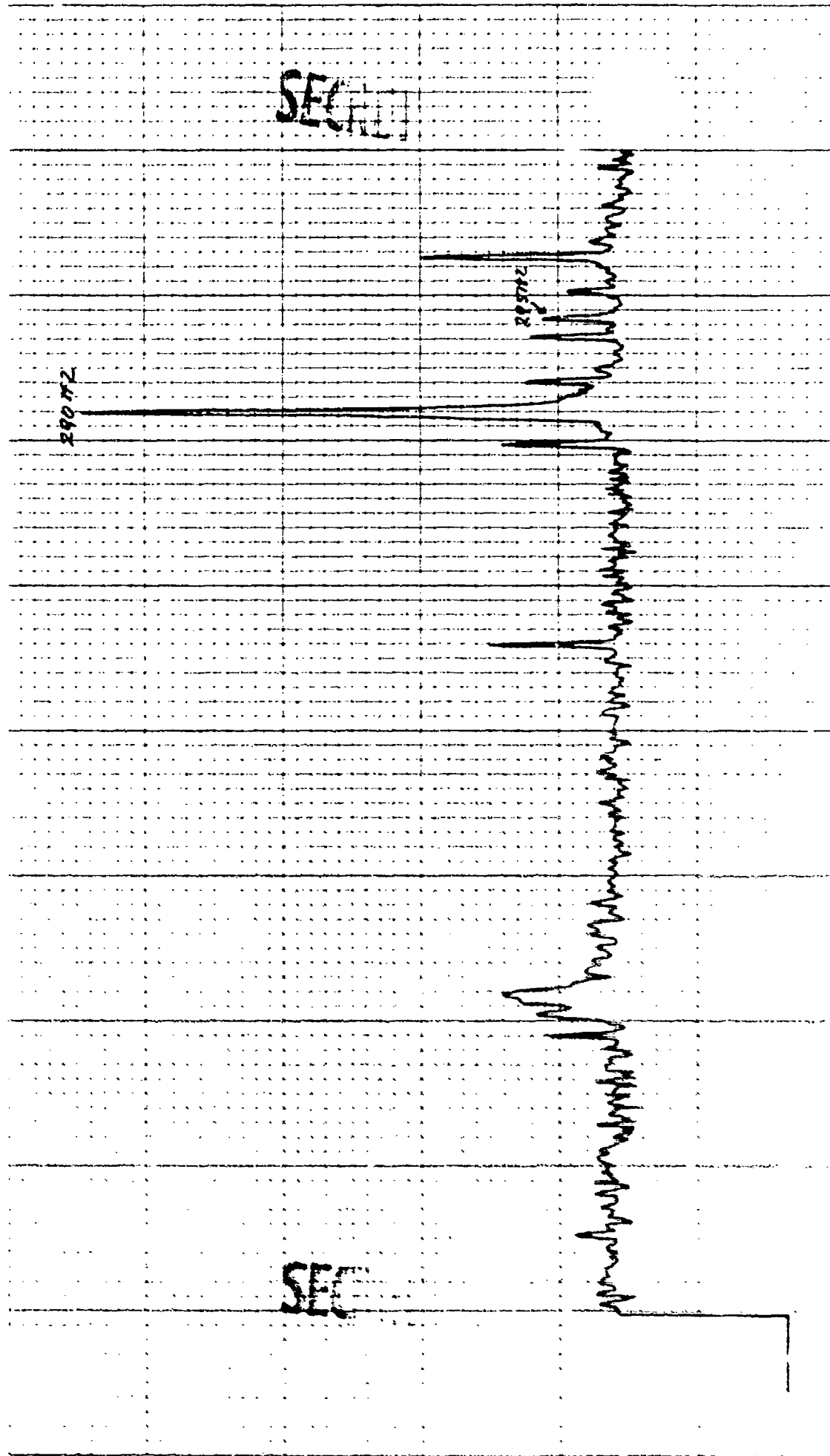


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CONTROL: 1501 - 16 (DPO)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
28-44
DATE/TIME: 37877 - 150/Z
ANALYSIS BANDWIDTH: 1/10HZ
+25 DEG. AZ STEERING

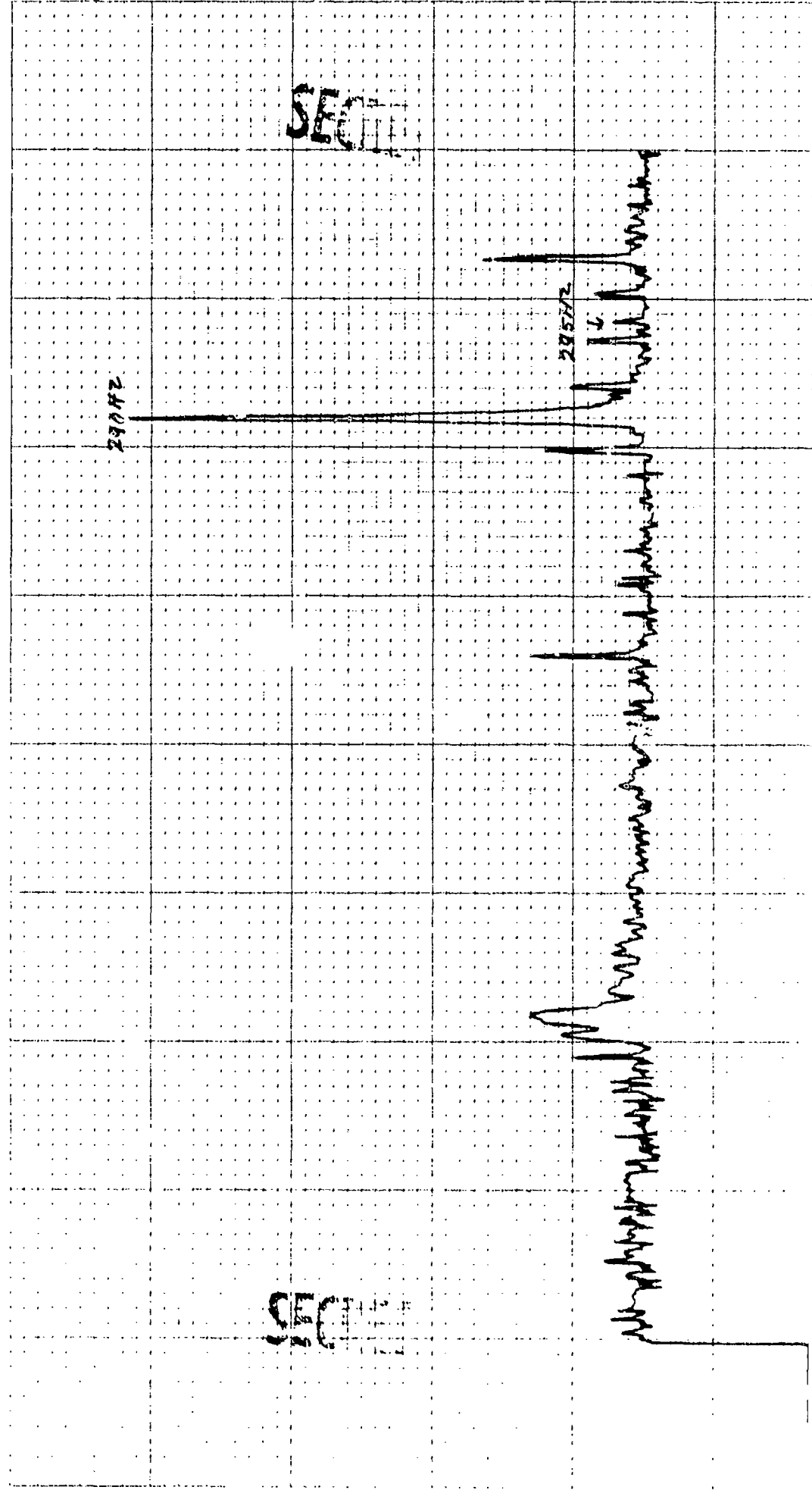
REEL: 144 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: 78 DB
FILTFR WTG: HANNING



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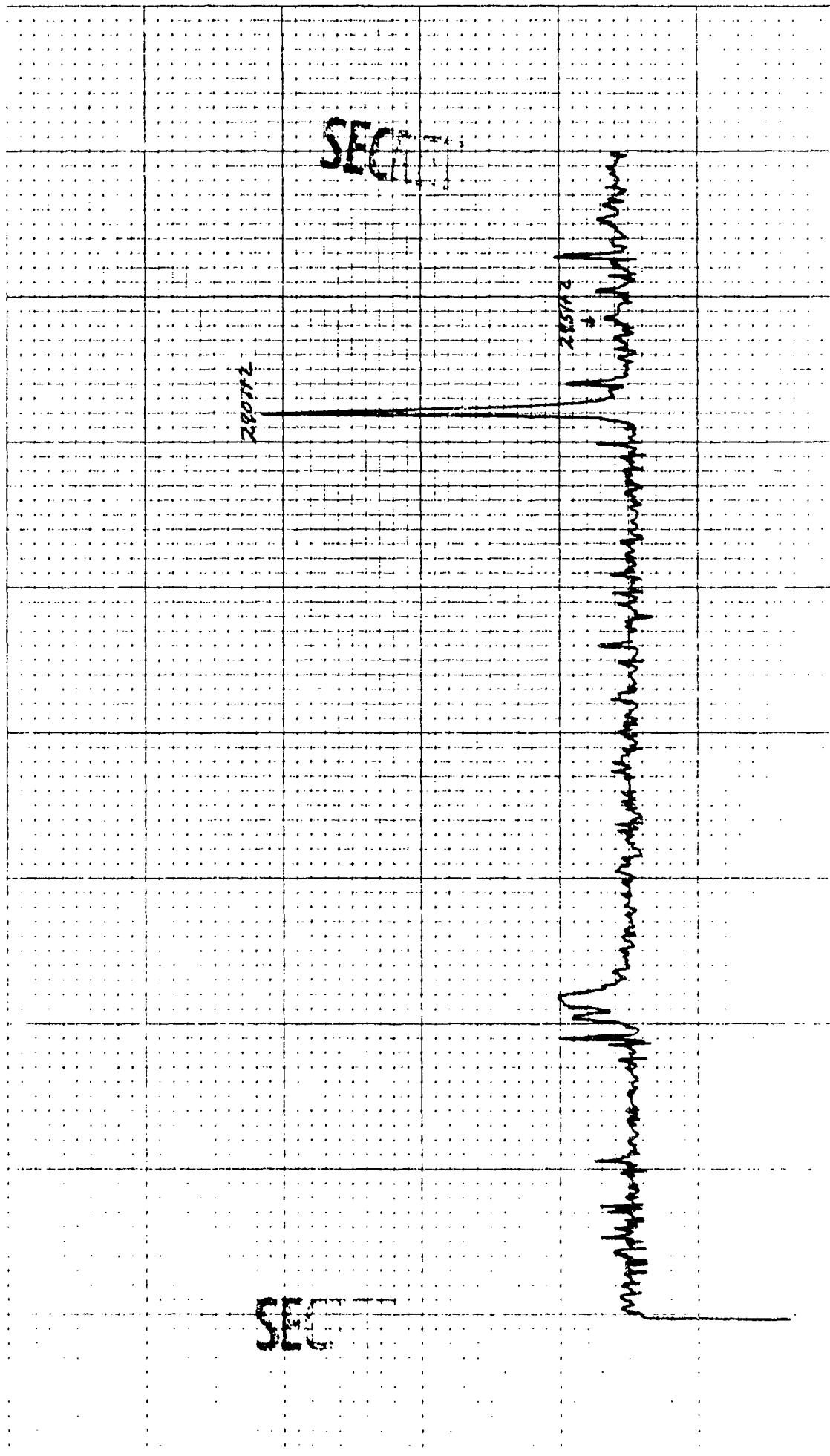
CONTROL: 1501-16 (DP2) DATE OF ANALYSIS: 29-44 REEL: 144 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 -1501Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +27 DEG. AZ STEERING



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Page 1 of 1

CONTROL: 1501 - 16 (DP8) REEL: M4 INDEX: 1501
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 29-44
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -18 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 16 ELEMENTS + 29 DEG. AZ STEERING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-27.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-17.2</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+12.8</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>+13</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-75.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-65.1</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-35.1</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+12.8</u>	
SIGNAL LEVEL FOR SNR	<u>-35.1</u>	<u>+7.9</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>43.9</u>	
MRA CORRECTION	<u>+ .2</u>	<u>44.1</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>35.9</u>	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-23.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-13.8</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+16.2</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+17</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-75.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-65.2</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-35.2</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+16.2</u>	
SIGNAL LEVEL FOR SNR	<u>-35.2</u>	<u>51.4</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>47.4</u>	
MRA CORRECTION	<u>+ .8</u>	<u>48.2</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>40.0</u>	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-50.4</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-20.4</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-19.6</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-74.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-64.4</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-34.4</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-20.4</u>	
SIGNAL LEVEL FOR SNR	<u>-34.4</u>	<u>14</u>	
PROCESSOR CORRECTION	<u>-4.2</u>	<u>9.8</u>	
MRA CORRECTION	<u>+ .8</u>	<u>10.6</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>2.4</u>	SNR 1 HZ BAND

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DATA POINT 8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+13.0</u>	<u>+17.0</u>	<u>-19.6</u>
ARRAY SIGNAL GAIN	<u>32.4</u>	<u>32.3</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ 2.3</u>	<u>+2.2</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>44.1</u>	<u>48.2</u>	<u>10.6</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>14.7</u>	<u>12.8</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.4</u>	<u>15.2</u>	<u>14.7</u>
DIFFERENCE	<u>+ 1.3</u>	<u>- 2.4</u>	<u> </u>

CONFIDENTIAL

46 0703

DATE OF ANALYSIS: - - - -
20-26 28-53)
DATE/TIME: 3-577-150/2
ANALYSIS BANDWIDTH: 1/10HZ
4/8 DEG. AZ STEERING

REEL: M4

INTEGRATION TIME 320 SECS
ATTN:-30 DB
FILTER WTG:HANNING

INDEX 300c

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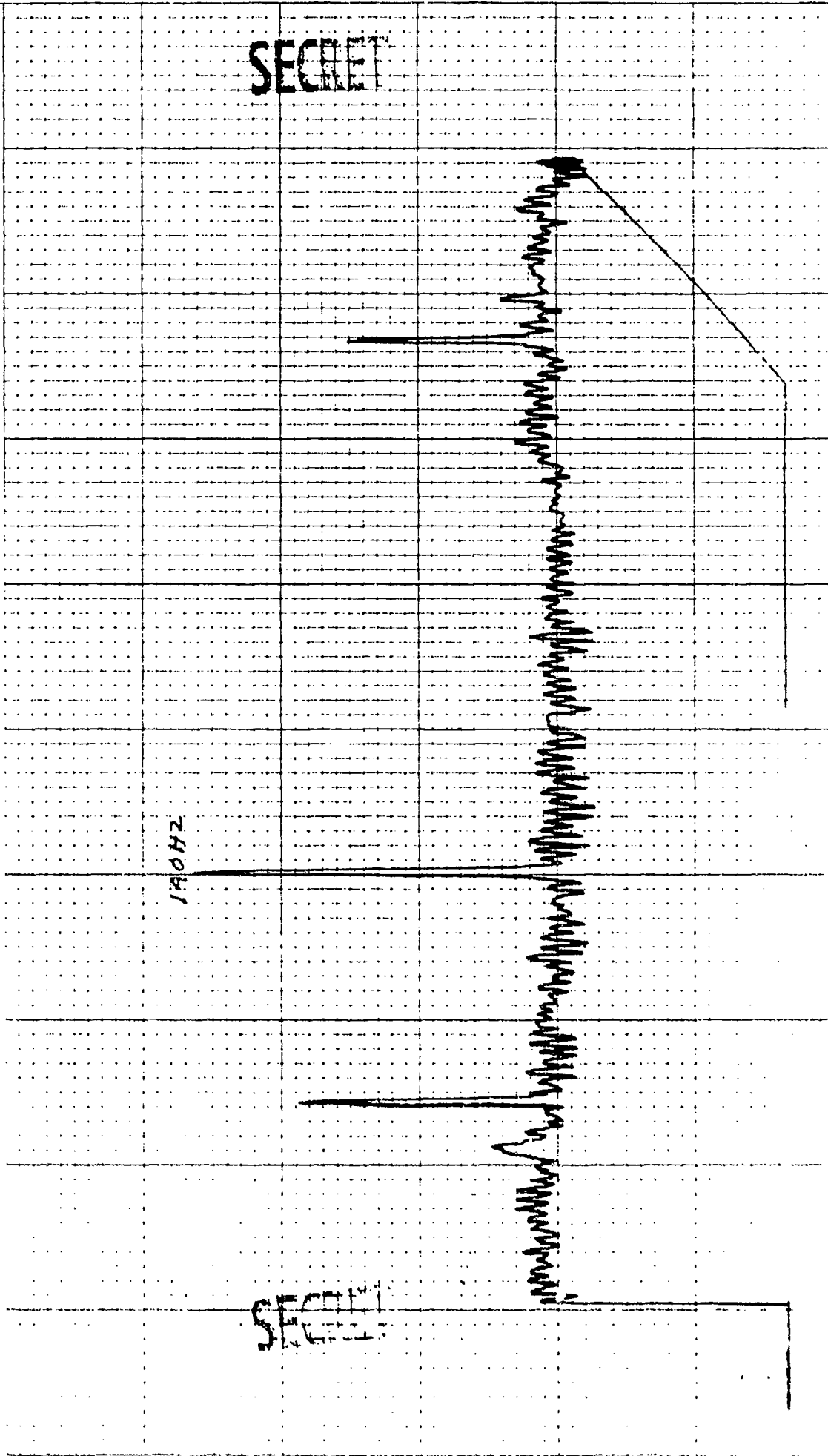
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CONTROL: 1501 - 32 (DP8)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 30-268 28-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING

REEL: M4
INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILTFR WTG: HANNING



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14012

46 0703

CONTROL: 1501 - 32 (DPE)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-80 09-53
DATE/TIME: 3-15-77 - 1501Z
ANALYSIS BANDWIDTH: 1/10HZ
+1/4 DEG. AZ STEERING

REEL: 14
INTEGRATION TIME 320 SECS
FII.TFR
WTG: HANNING

INDE X3000
ATTEN: -30 DB

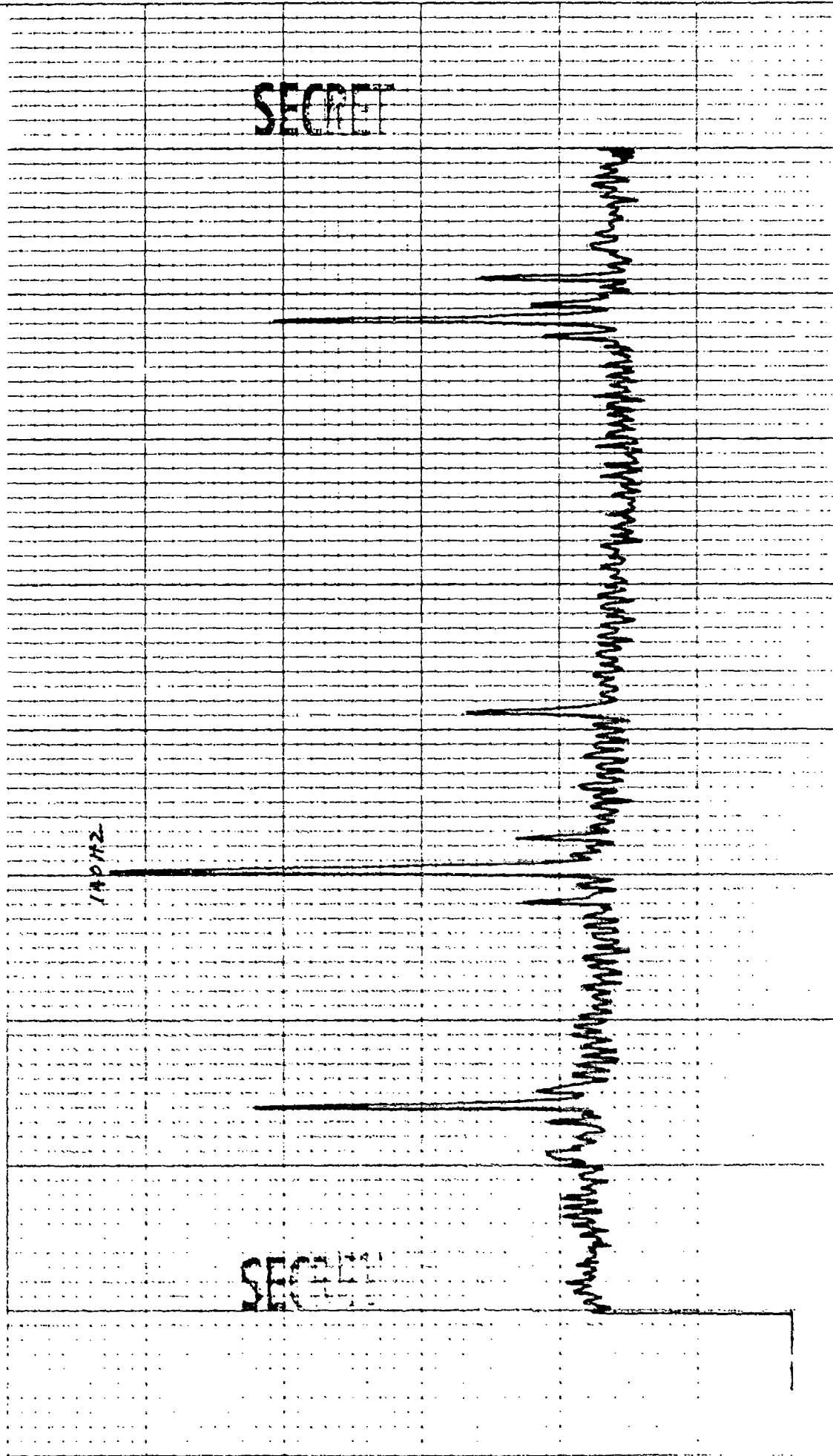
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CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: 20-26429-53 REEL: 44 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 - 150/ Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FLT.FTR WTG: HANNING
CENTER FREQ: 150 HZ +16 DEG. AZ STEERING



1/4 X 2 1/2 IN. 100% 100% 100% 100%

46 0703

CONTROL: 1501 - 32 (DPO)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BLARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-268/29-53
DATE/TIME: 3-15-77-150/2
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEG. AZ STEERING

REEL: 44
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
INDE XJ00c
ATTEN: -30 DB

150HZ

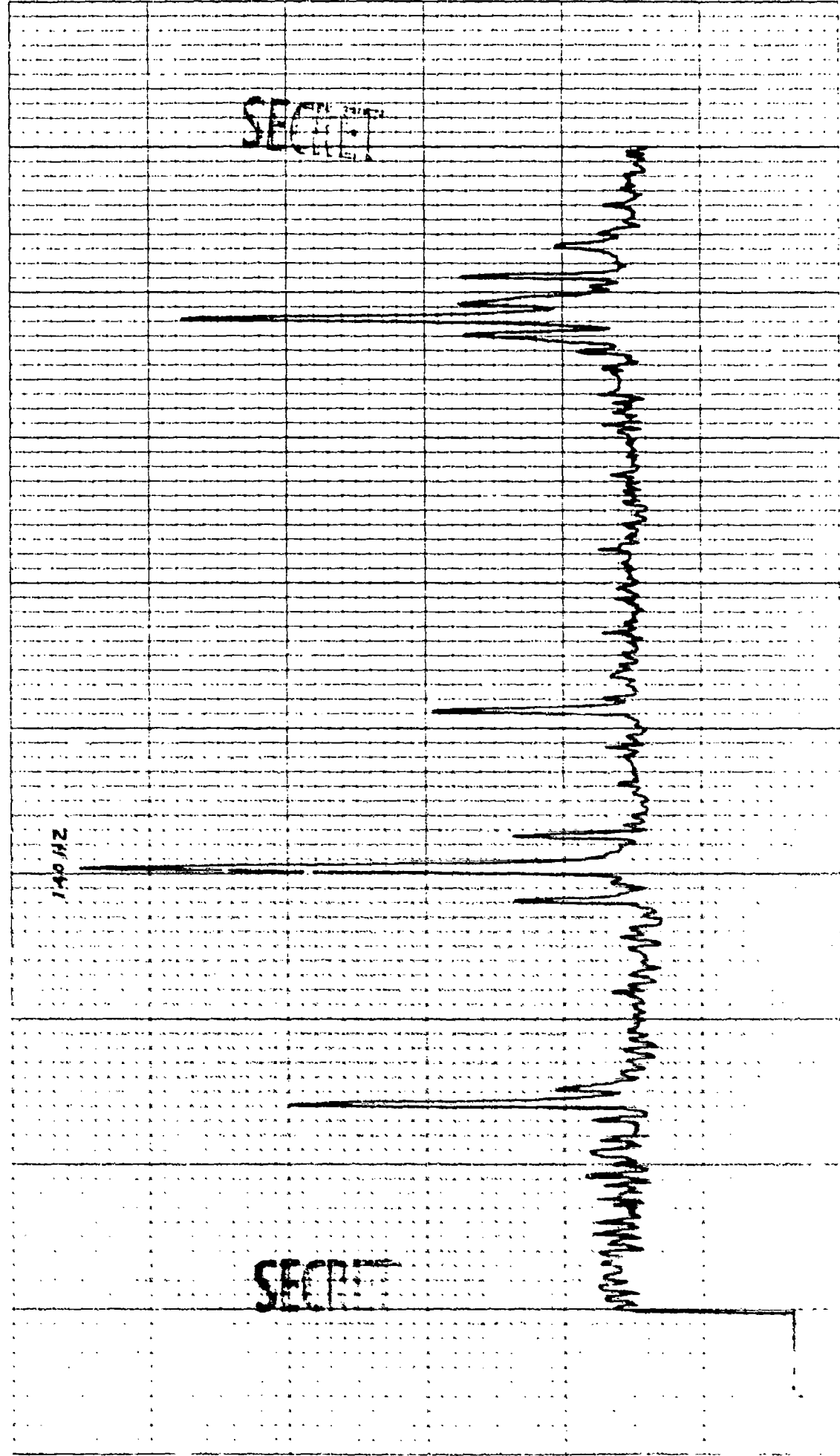
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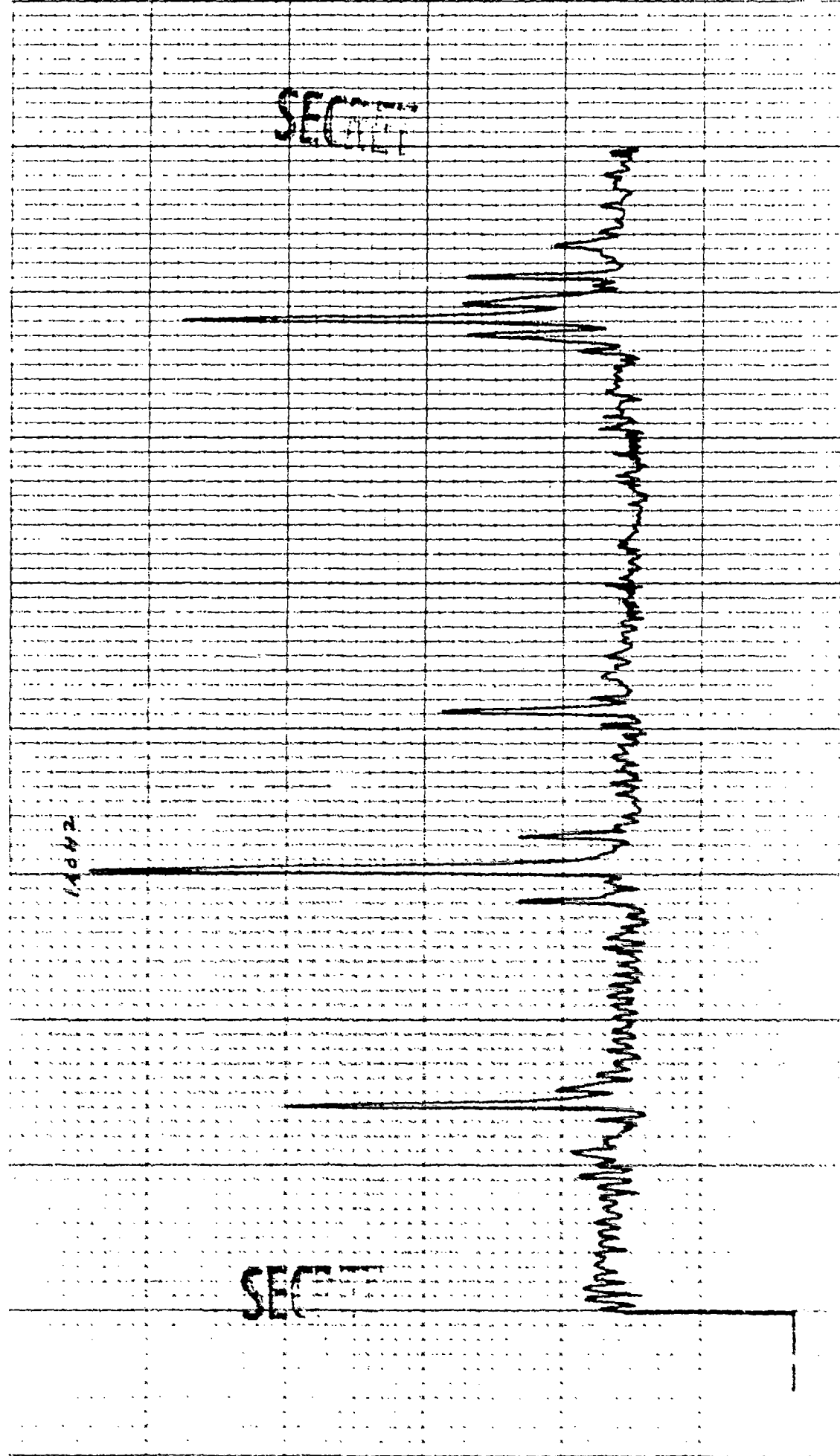
CONTROL: 1501 - 48 (DP8) DATE OF ANALYSIS: 20-26-53 REEL: 114 INDEX X 3100
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ. STEERING
32 ELEMENTS



10-10-10 10:10:10 10:10:10 10:10:10

46 0703

CONTROL: 1501 - 12 (200) DATE OF ANALYSIS: 20-26-09-53 REEL: 14 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 - 150 / Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1 / 10HZ FI.TFR WTG: HANNING
CENTER FREQ: 150 HZ
32 ELEMENTS

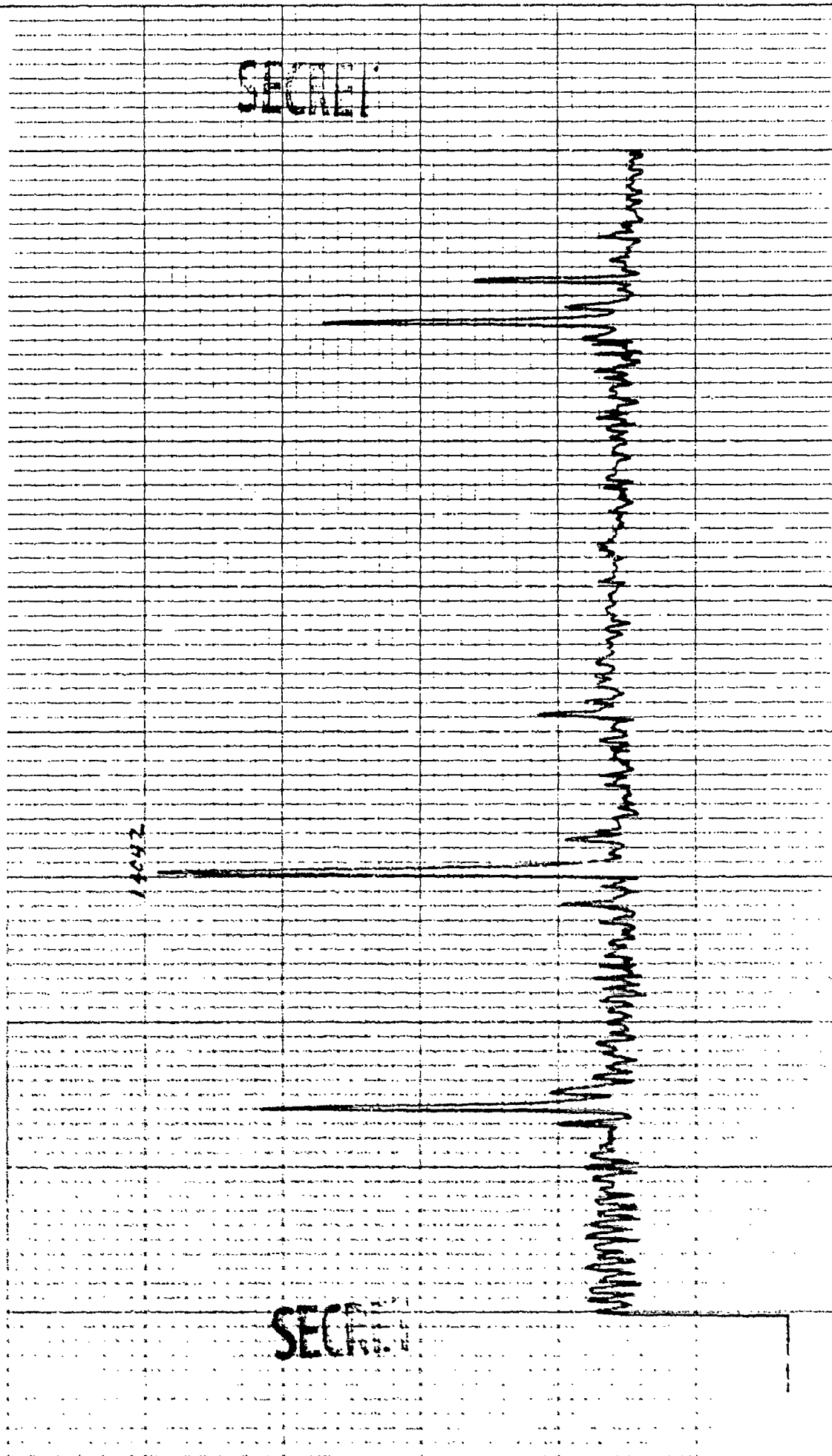


CONTROL: 1501 - 32 (DPB)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 20-268 20-268
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 26 DEG. AZ STEERING

REEL: 14
 INTEGRATION TIME 320 SECS
 FIITFR
 ATTN: -30 DB
 WTG: HANNING

INDE X3000



45 0703

CONTROL: 1501 - 70 (200)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-06-88-53
DATE/TIME: 2-15-77-1500Z
ANALYSIS BANDWIDTH: 11/10HZ
+20 DEG. AZ STEERING

REEL: 44 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: 20 DB
FILTER WTC: HANNING

140HZ

SECRET

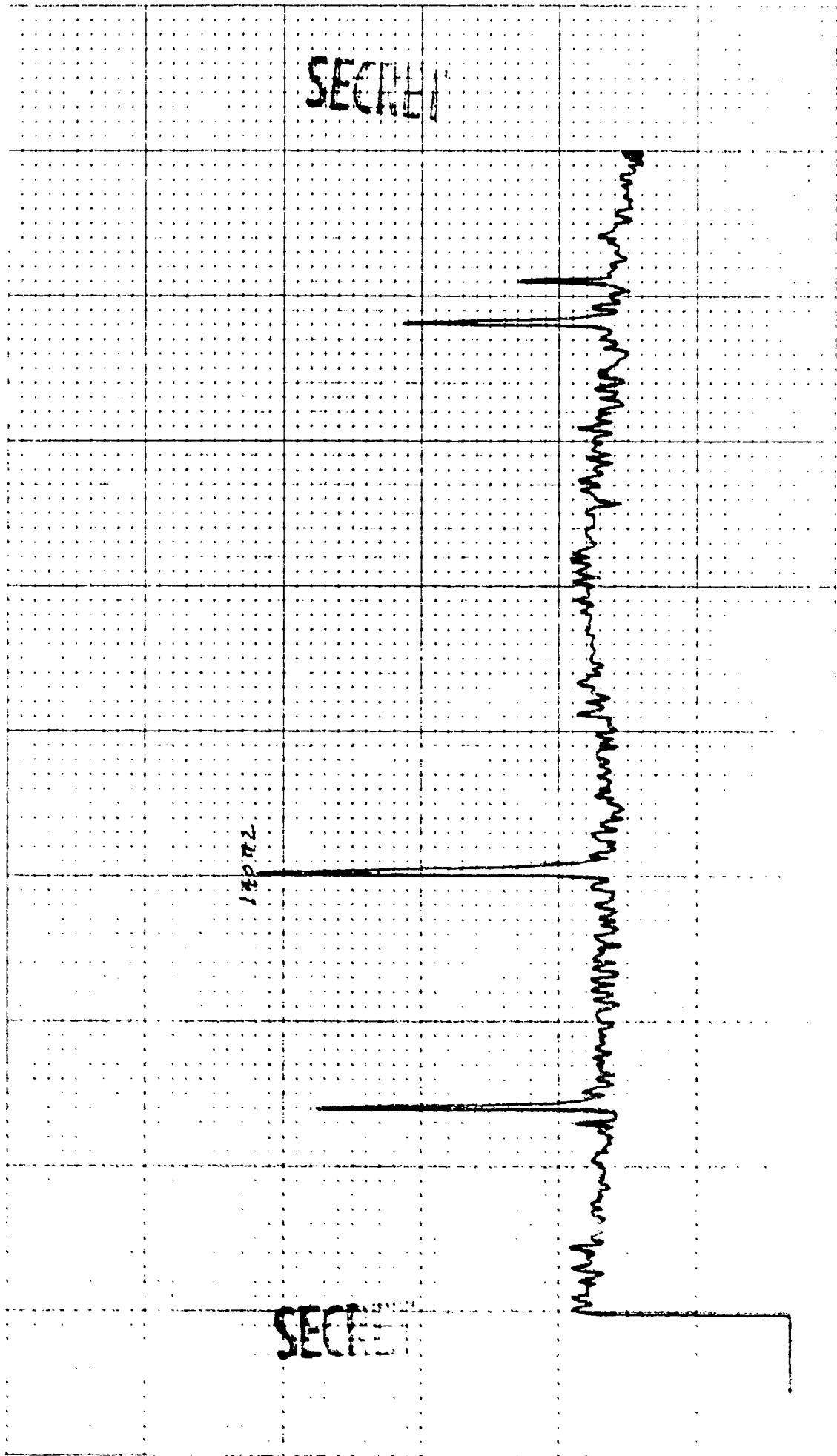
SECRET

Information was obtained from the source of the information reported in this report

46 0700

REF 2400 2000 2000 2000

CONTROL: 1501 - 32 (DPE) DATE OF ANALYSIS: 20-20-53 REEL: 144 INDEX: 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 170 DEG. AZ STEERING



46 0703

CONTROL: 1501 - 32 (D90)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - -
20-26 09-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 10 DEG. AZ STEERING

REEL: 44 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FITTED WTG: HANNING

SECRET

SECRET

19042

20542

At 1501-32, the bearing stake exercise was conducted. The results of the analysis are shown in the plot. The bearing stake exercise was conducted at 1501-32, and the results of the analysis are shown in the plot. The bearing stake exercise was conducted at 1501-32, and the results of the analysis are shown in the plot.

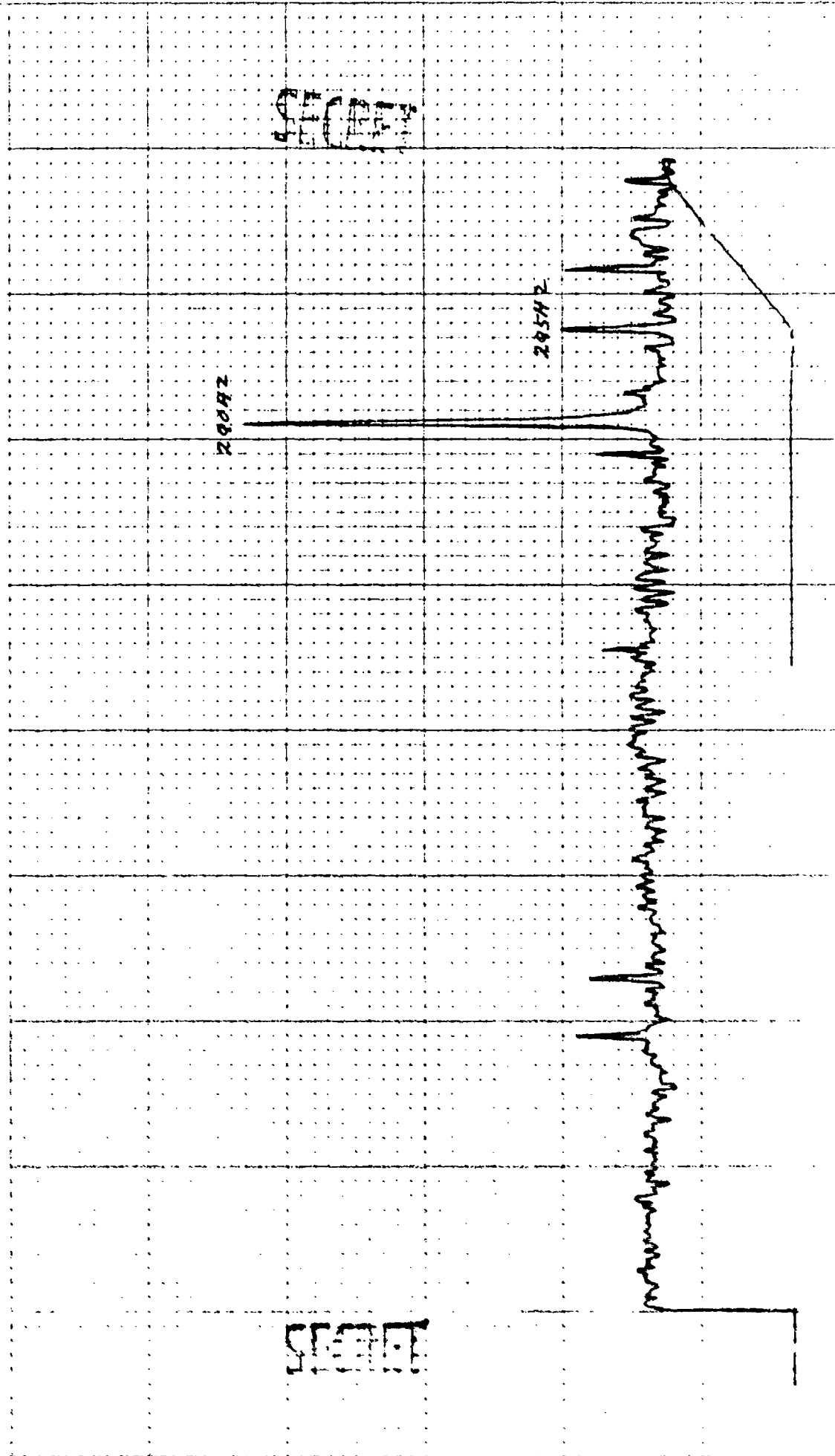
46 0703

CONTROL: 1501 - 72 (200) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 20-26 29-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +12 DEC. AZ STEERING

REEL: MY

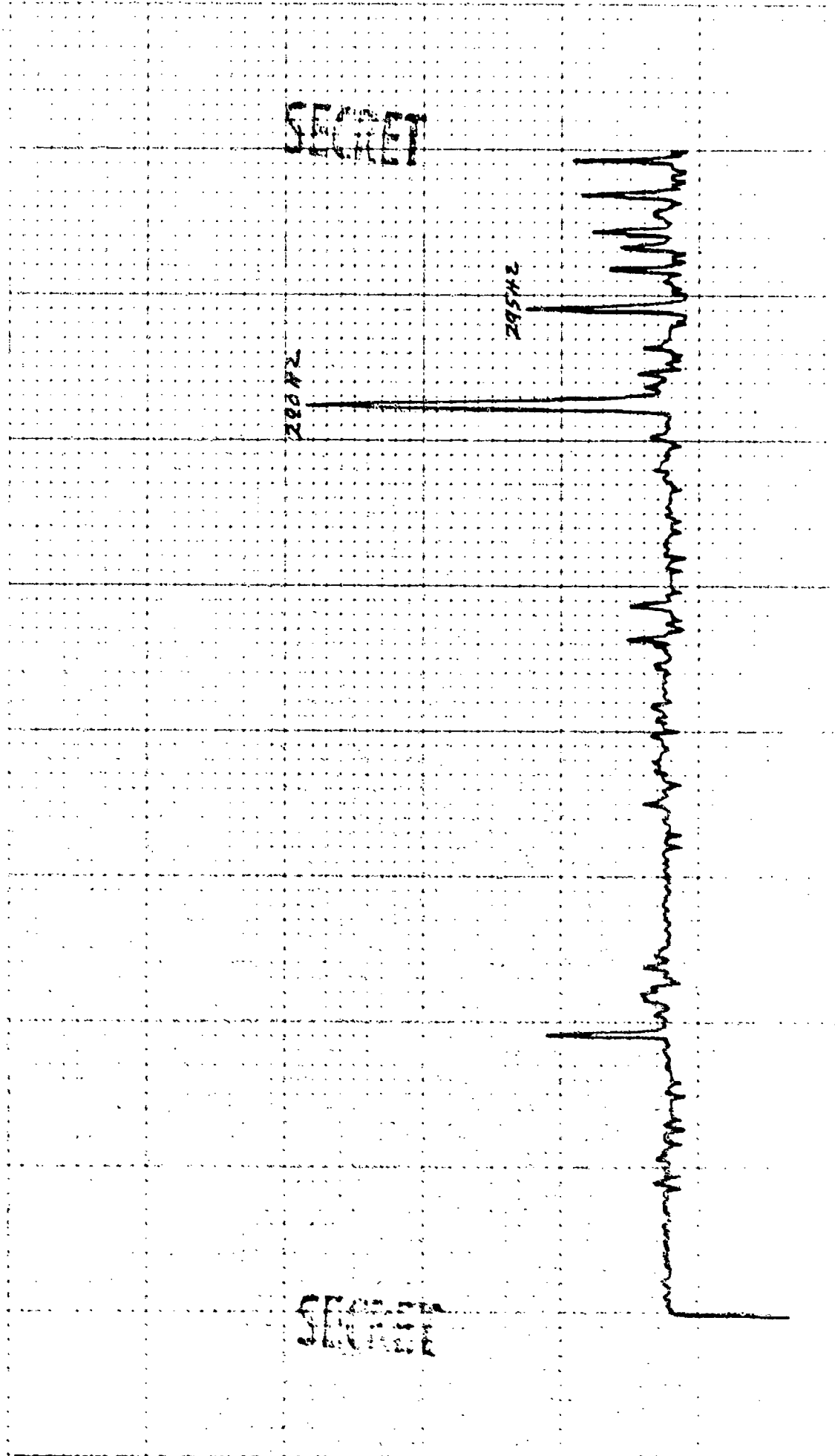
INDEX 3000

INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTC: HANNING



46 0703

CONTROL: 1501 - 32 (200)
BEAMFORMED SPECTRUM(ELEMENTS) 20-268 2953
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
22 ELEMENTS
DATE OF ANALYSIS: 20-268 2953
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
14 DEG. AZ STEERING
REEL: 144
INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: -20 DB
FILTFR
WTG: HANNING

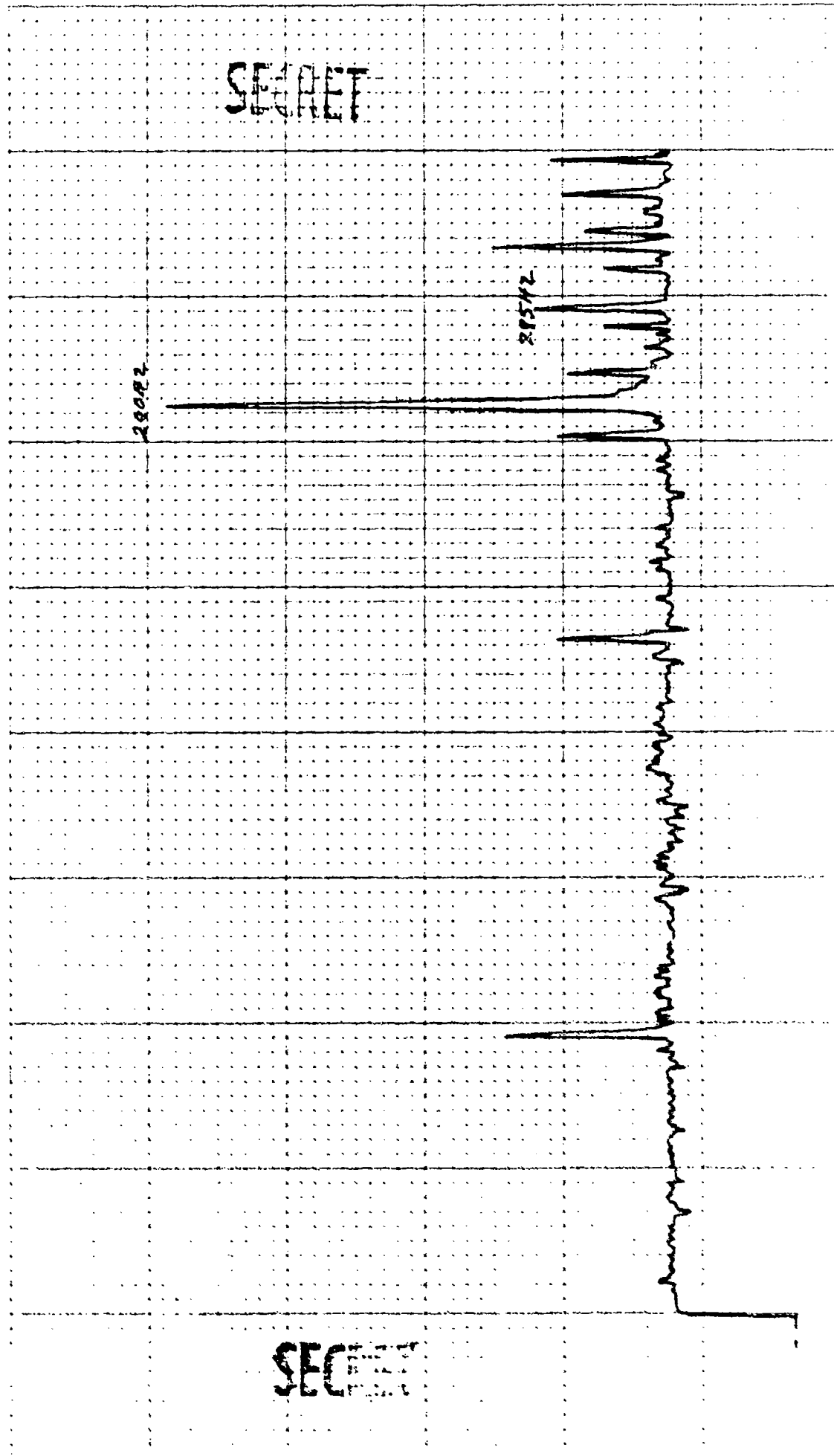


46 0703

CONTROL: 1501 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-06-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+1/2 DEG. AZ STEERING

REEL: NY
INDE X 3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING

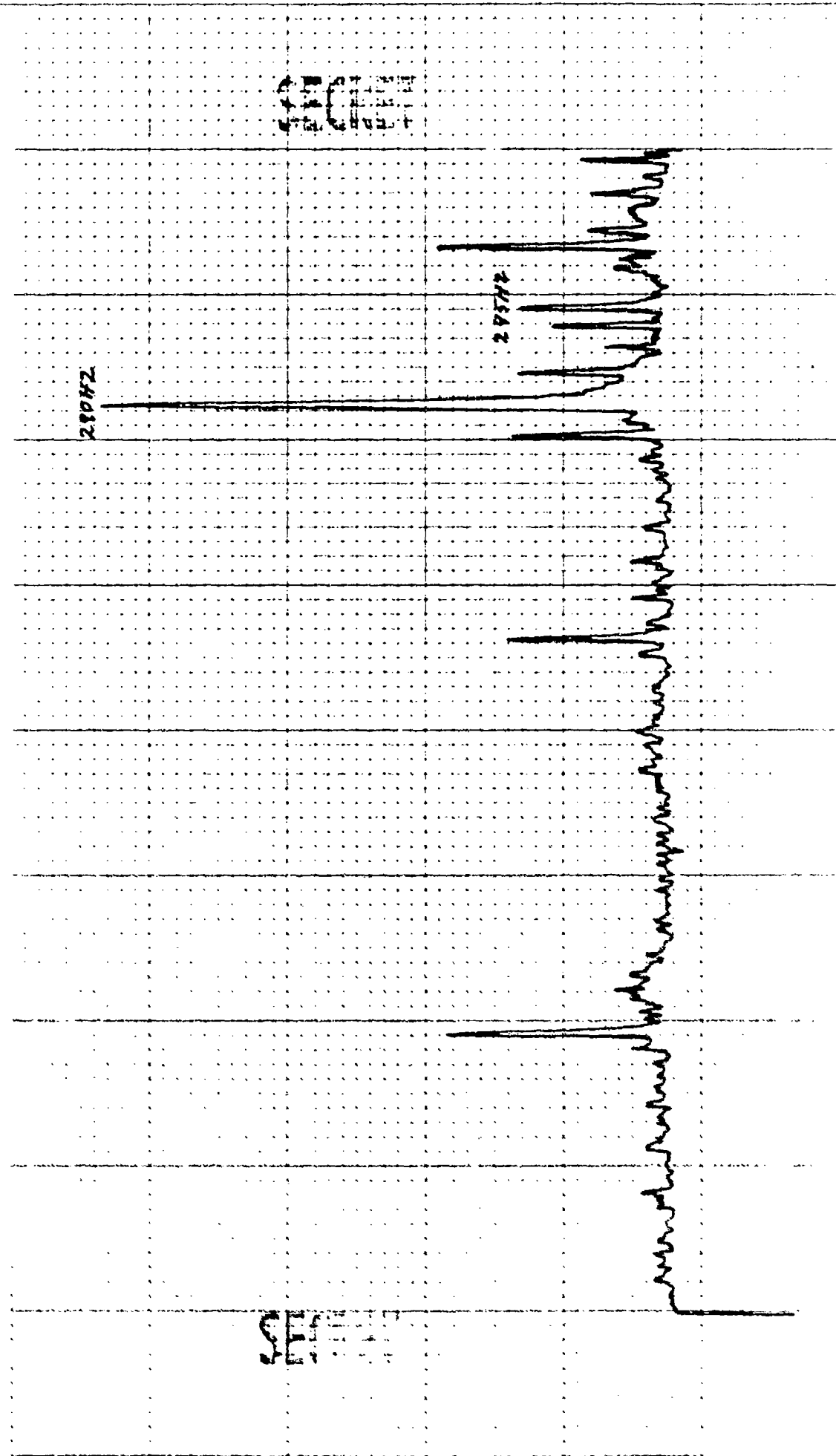


46 0703

CONTROL: 1501 - 32 (D18)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

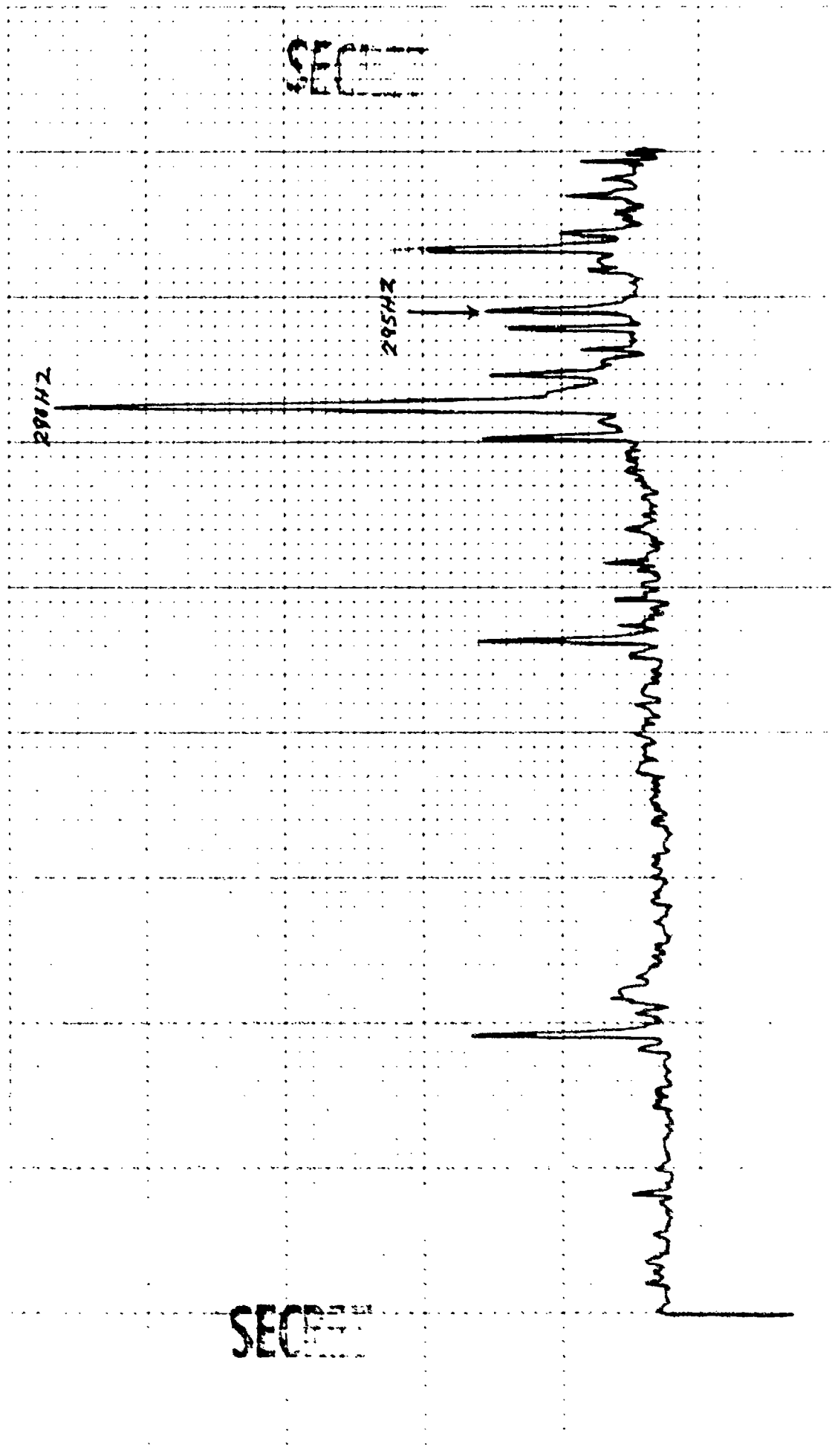
DATE OF ANALYSIS: 20-26-78-53
DATE: TIME: 17:55:17 - 190/2
ANALYSIS BANDWIDTH: 1/10 HZ
+18 DEG. AZ STEERING

REEL: M4 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: -70 DB
FILTER WTC: HANNING



46 0703

CONTROL: 1501 - 48 (DPR) DATE OF ANALYSIS: 20-26-53
BEAMFORMED SPECTRUM(ELEMENTS) REEL: M4 INDE X 3000
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 270 HZ FILTER WTC: HANNING
22 ELEMENTS +20 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10 HZ



46 0707

CONTROL: 1501 - 32 (000)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-89-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
12.2 DEG. AZ STEERING

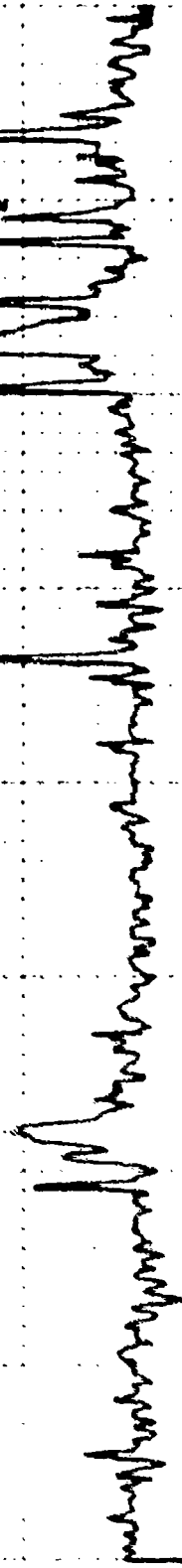
REEL: 14 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING

21002

SECRET

SECRET

205 HZ



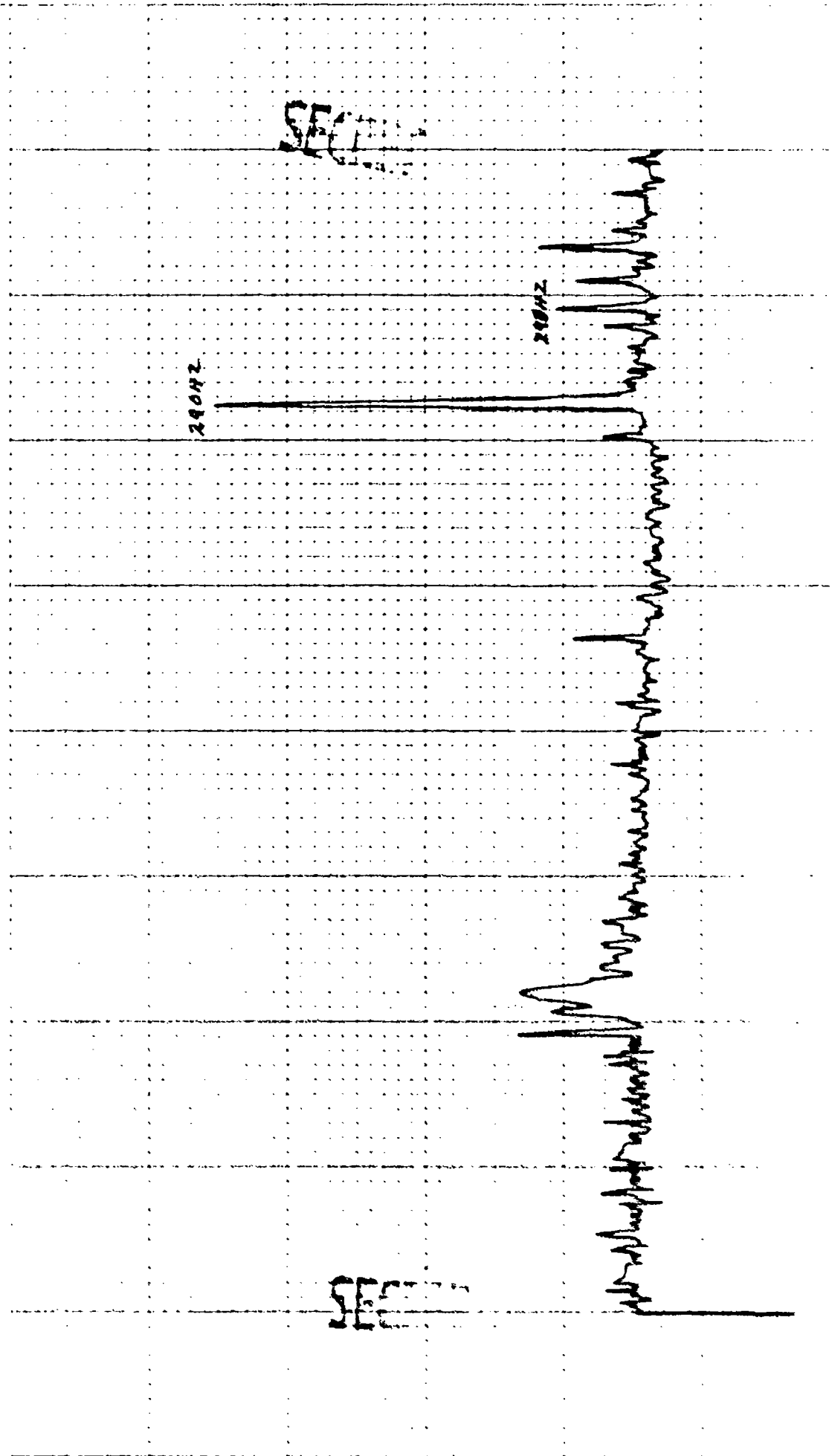
46 0703

CONTROL: 1501 - 32 (DP8)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-89-53
DATE/TIME: 5-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
4 24 DEG. AZ STEERING

REEL: M4
INDE X3000

INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTERED
WTC: HANNING



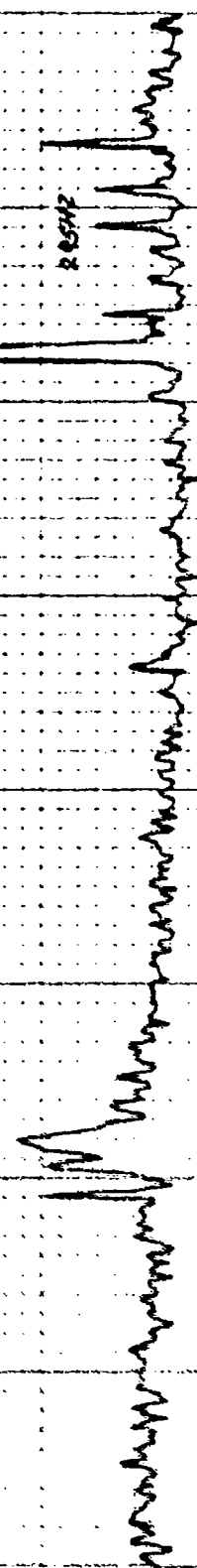
46 0703

CONTROL: 1501 - 72 (200) DATE OF ANALYSIS: REEL: M4 INDE X 3000c
BEAMFORMED SPECTRUM(ELEMENTS) 20.200 20-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 7-5-77 - 1501 Z FILTERED WTC: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
72 ELEMENTS 720 DEG. AZ STEERING

SECRET

200 HZ

200 HZ



K-Σ 1/2 X 10 TO THE INCH • X 10 HIPS
KEUPPEL & ESS'G CO. MADE IN U.S.A.

46 0703

CONTROL: 1501 - 32 (298)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

32 ELEMENTS

DATE OF ANALYSIS: -- --

20-26 29-53

DATE/TIME: 3-5-77 - 150/Z

ANALYSIS BANDWIDTH: 1/10 HZ

+38 DEG. AZ STEERING

REEL: 44

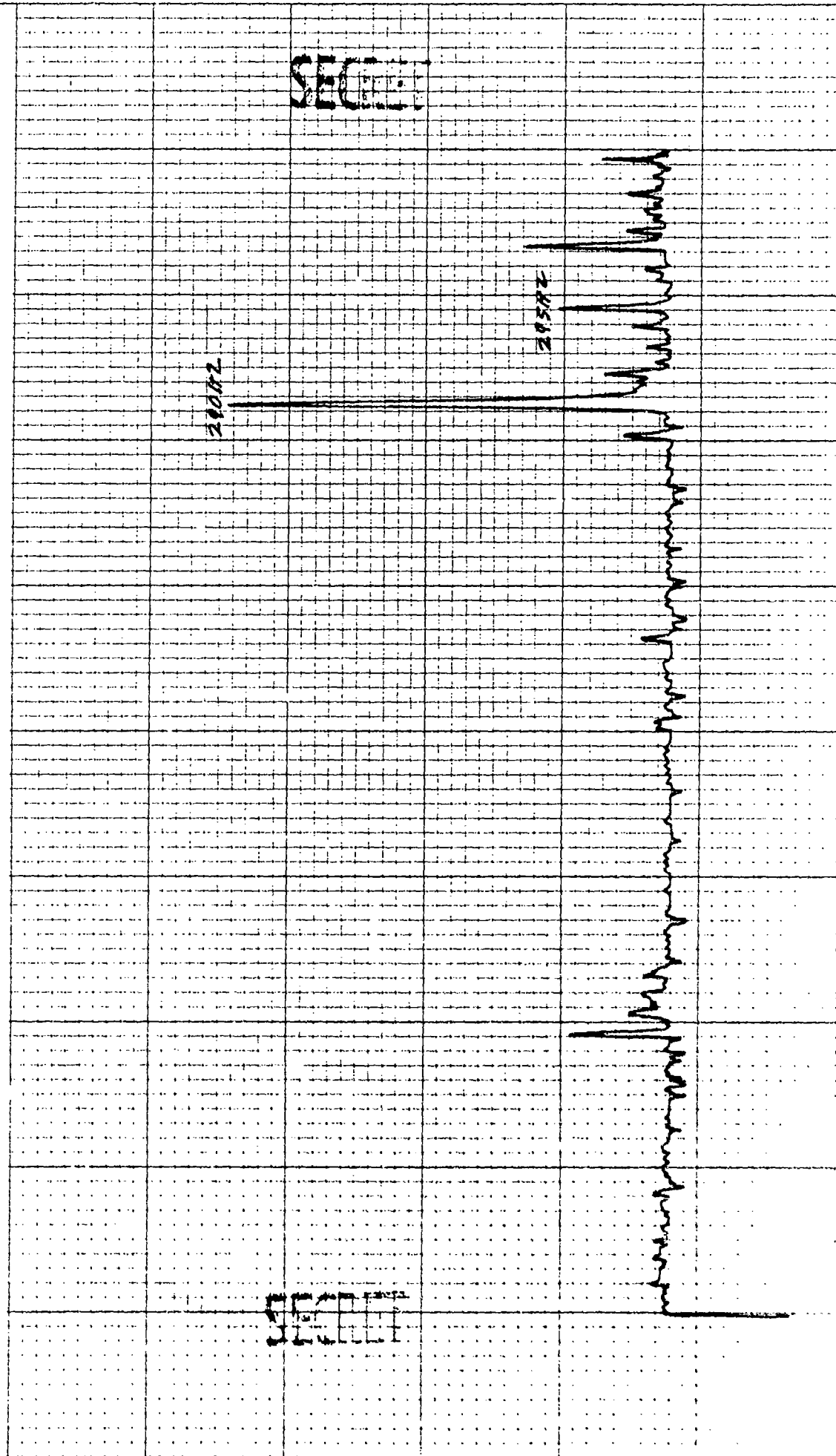
INDE X 3000

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -30 DB

WTG: HANNING



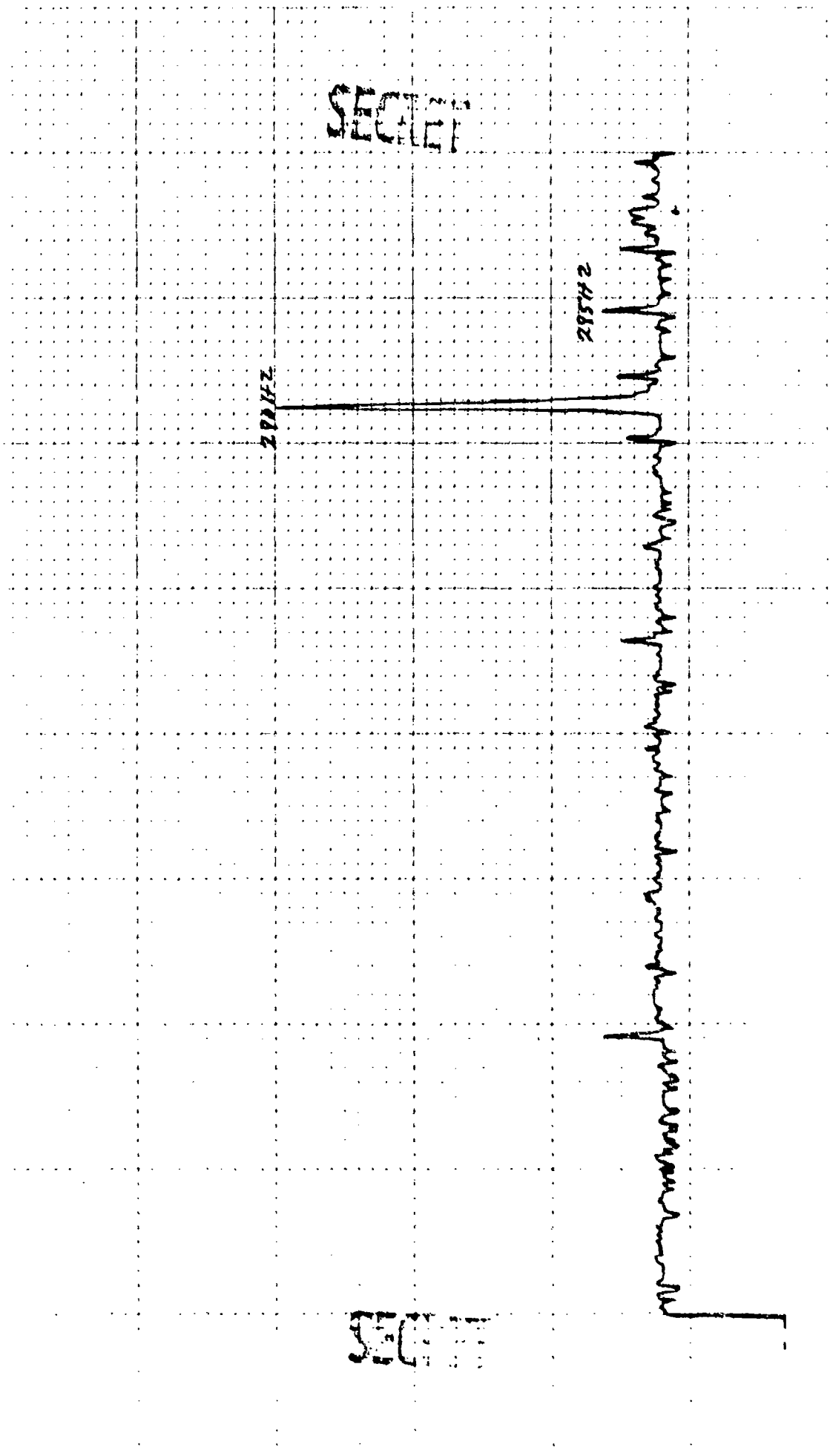
46 0703

CONTROL: 1501 - 32 (010)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-2-68 29-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+30 DEG. AZ STEERING

REEL: 44
INDE X 3000

INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILT: WIG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-27</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-17
BEAMFORMER GAIN	<u>+30</u>	+13 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+13.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-71.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.6
BEAMFORMER GAIN	<u>+30</u>	-31.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+13</u>	
SIGNAL LEVEL FOR SNR	<u>-31.6</u>	44.6
PROCESSOR CORRECTION	<u>-4.0</u>	40.6
MRA CORRECTION	<u>+ .2</u>	40.8 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	32.6 SNR 1 HZ BAND

SECTION 9

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-24.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-14.0</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+16.0</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+16.8</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-63.4</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-33.4</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+16.0</u>	
SIGNAL LEVEL FOR SNR	<u>-33.4</u>	<u>49.4</u>	
PROCESSOR CORRECTION	<u>-9.2</u>	<u>45.4</u>	
MRA CORRECTION	<u>+ .8</u>	<u>46.2</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>38.0</u>	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 40

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.0	
BEAMFORMER GAIN	<u>+30</u>	-20.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-19.2	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.1	
BEAMFORMER GAIN	<u>+30</u>	-33.1	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-20.0</u>	
SIGNAL LEVEL FOR SNR	<u>-33.1</u>	13.1	
PROCESSOR CORRECTION	<u>-4.2</u>	8.9	
MRA CORRECTION	<u>+ .8</u>	9.7	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	1.5	SNR 1 HZ BAND

CONFIDENTIAL

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DATA POINT 8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+13.2</u>	<u>+16.8</u>	<u>-19.2</u>
ARRAY SIGNAL GAIN	<u>33.6</u>	<u>32.0</u>	<u> </u>
20 LOG <u>40</u>	<u>33.6</u>	<u>33.6</u>	<u> </u>
# of elements	<u> </u>	<u> </u>	<u> </u>
DIFFERENCE	<u>-1.0</u>	<u>-1.6</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>40.8</u>	<u>46.2</u>	<u>9.7</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>11.4</u>	<u>10.8</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>15.3</u>	<u>16.9</u>	<u>17.0</u>
DIFFERENCE	<u>-3.9</u>	<u>-6.1</u>	<u> </u>

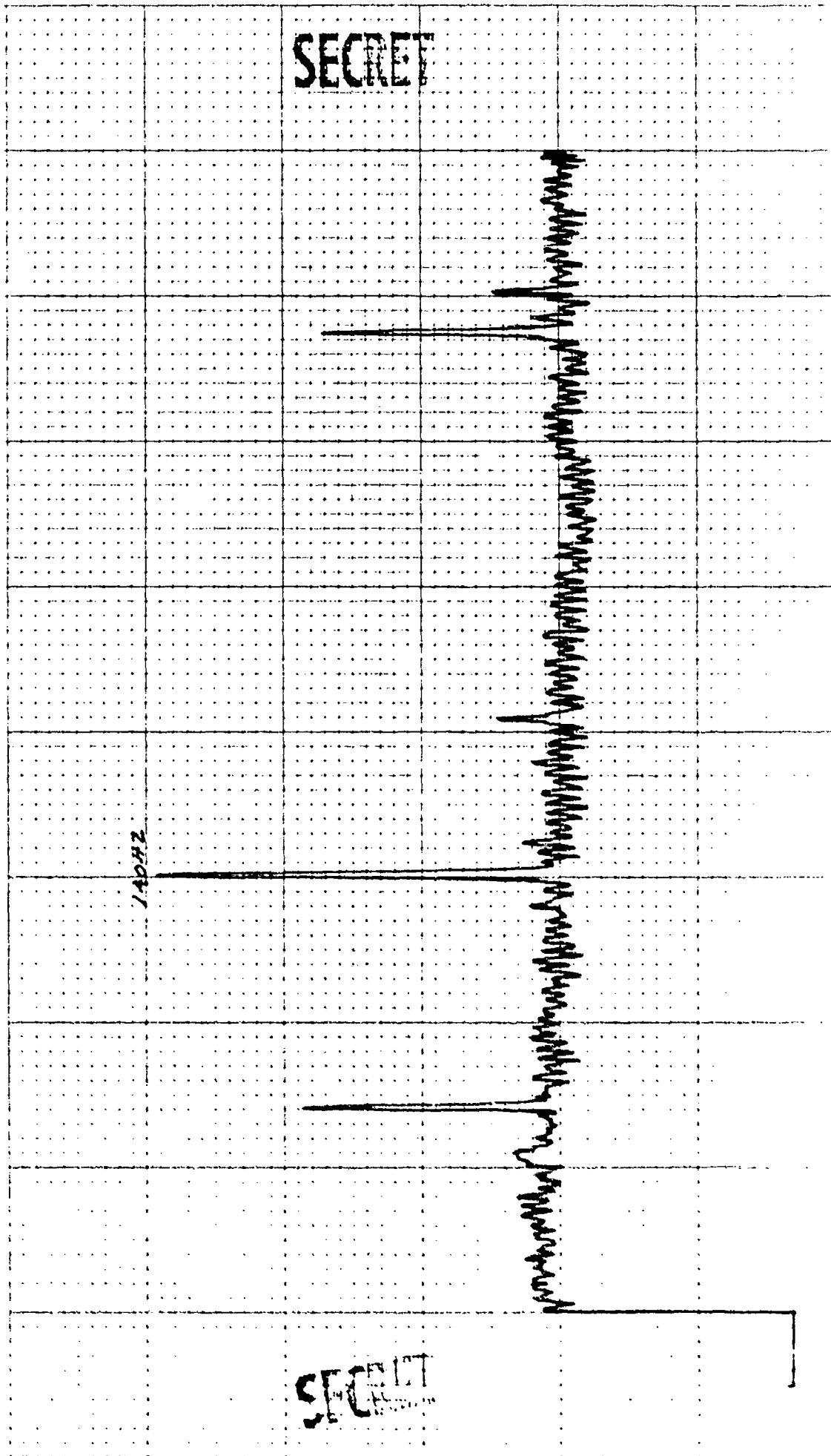
CONFIDENTIAL

46 0703

CONTROL: 1501 - 48 (200) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS 1-669-14916-26 29-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 1501 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
48 ELEMENTS +14 DEG. AZ STEERING

REEL: 44 INDE X3000

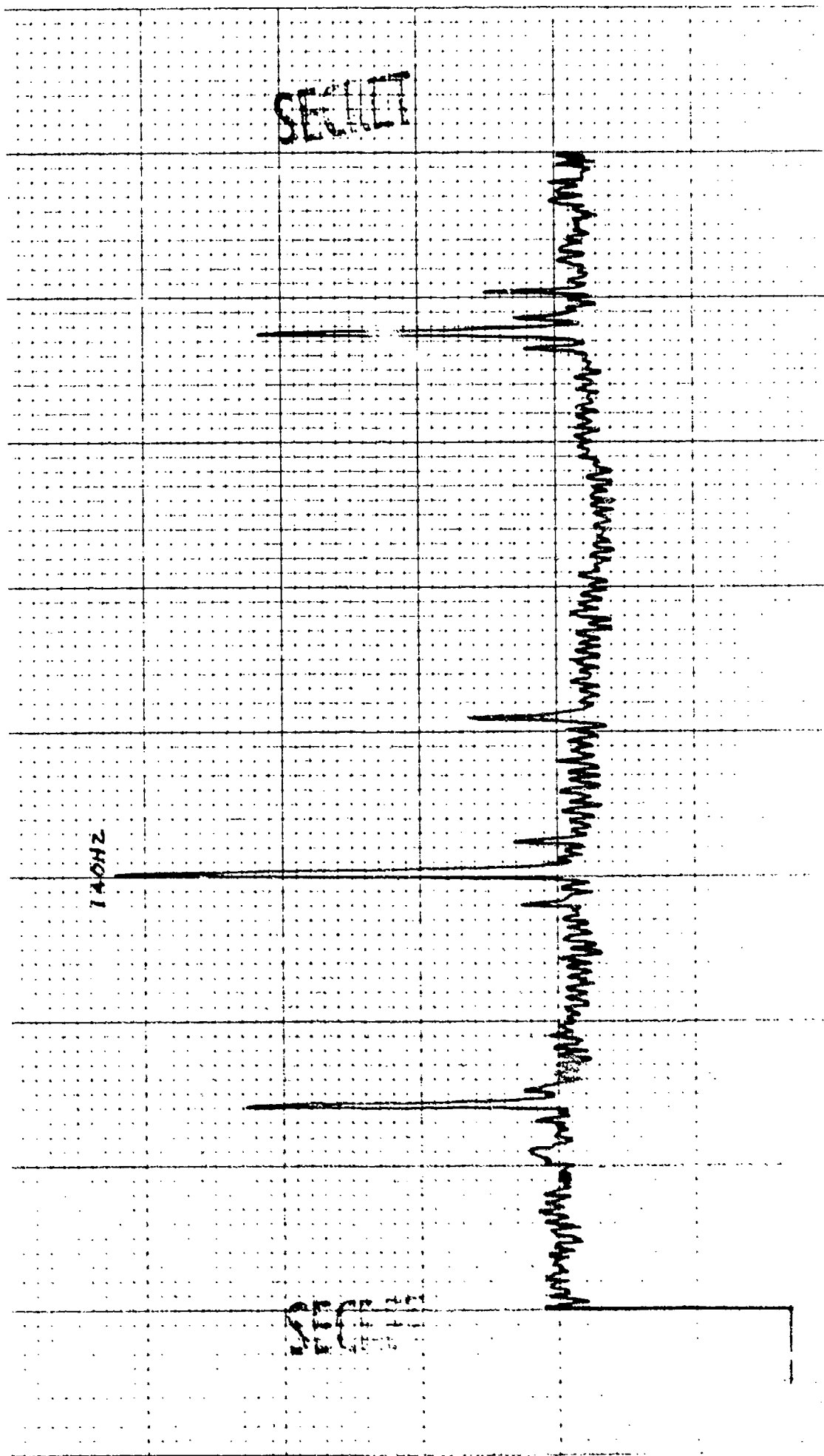
INTEGRATION TIME 320 SECS
FILT.FP WTC: HANNING



1000 3000 4000 5000 6000 7000 8000 9000 10000

46 0703

CONTROL: 1501 -40 (DPO) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENTS 1-249-14716-26402-53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS REEL: 44 INDE X3000
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR ATTN: -30 DB
40 ELEMENTS +16 DEG. AZ STEERING WTG: HANNING



46 0703

REEL: 44
INTEGRATION TIME 320 SECS
ATTN:-20 DB
WTC: HANNING
INDEX X3000

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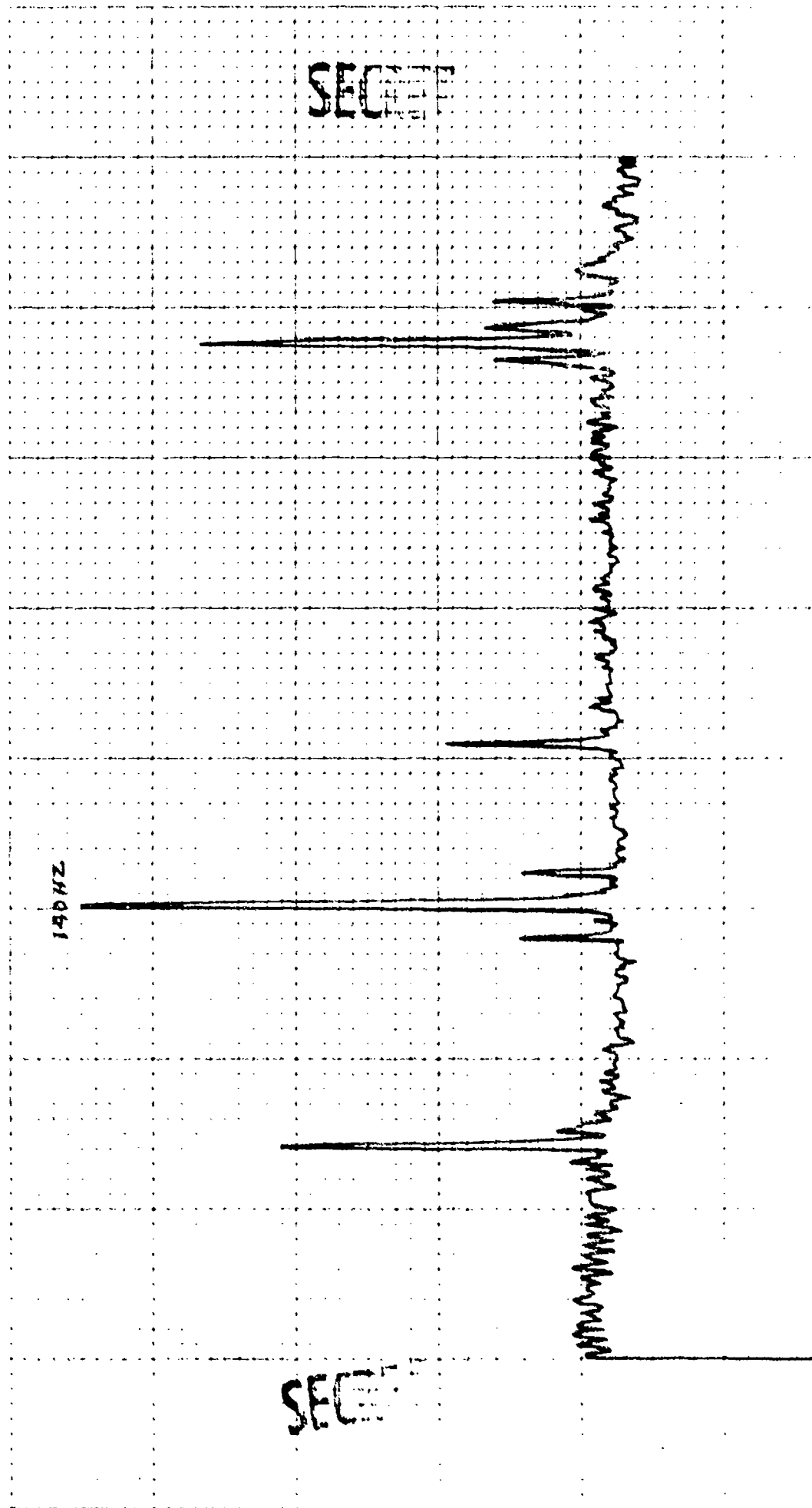
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46 0703

CONTROL: 1501 - 40 (DP8)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
40 ELEMENTS

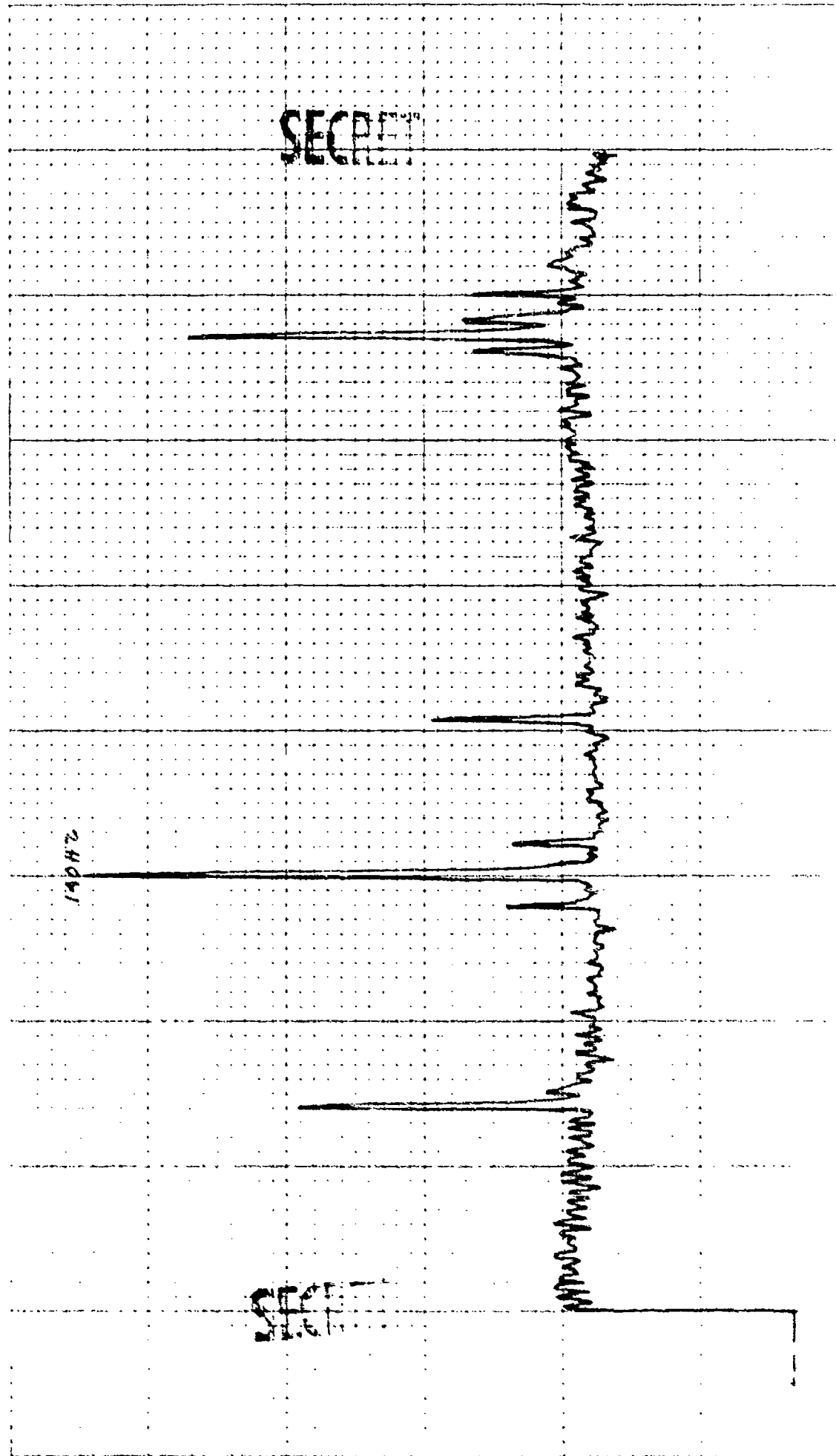
DATE OF ANALYSIS: 1-649-14416-26(24-53)
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
119 DEG. AZ STEERING

REEL: M4
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
INDE X3000
ATTEN: 30 DB



46 0703

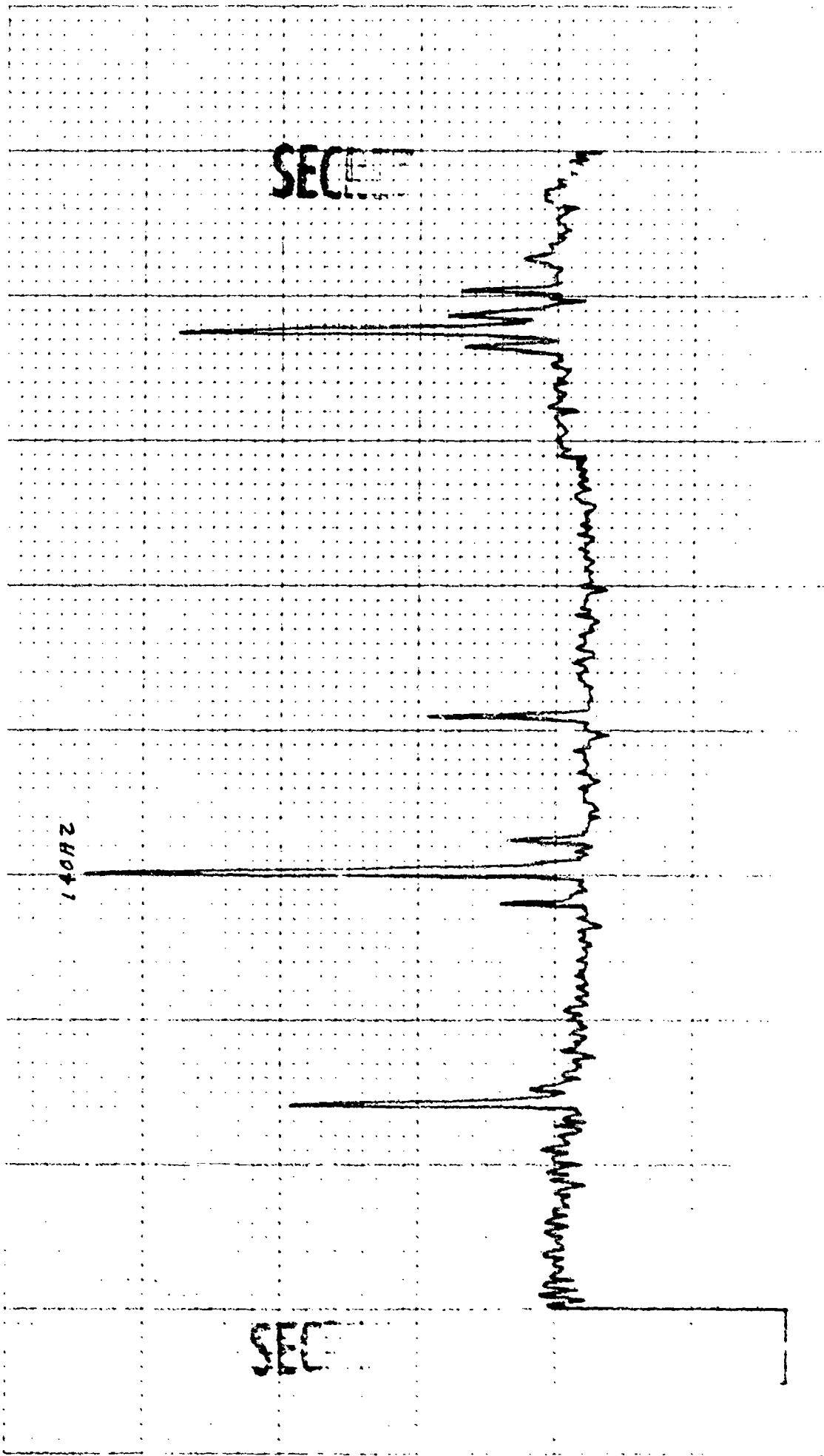
CONTROL: 1501 - 40 (DDB) DATE OF ANALYSIS: 1-6-49-14 16-36-28-53 INDE X 3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-70 - 150/2 INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ WIG: HANNING
CENTER FREQ: 150 HZ
40 ELEMENTS +20 DEG. AZ STEERING



46 0703

CONTROL: 1501 - 48 (DPB) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 18-14 16-26 20-53
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
48 ELEMENTS
REEL: 44 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -70 DB
FILTER WTC: HANNING

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 2/ DEG. AZ STEERING



46 0703

CONTROL: 1501 - 48 (288)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
48 ELEMENTS

DATE OF ANALYSIS: -
1-24-8-14-16-26-30-33
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
122 DEG. AZ STEERING

REEL: 44 INDEX: 3000
INTEGRATION TIME 320 SECS
ATTN: -30 DB
FILTER WTG: HANNING

140 HZ

SECRET

SECRET

140 HZ

46 0703

1-26 9-104 12-204 20-53

CONTROL: 1501 - 48 (DPO) REEL: 44 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26 9-104 12-204 20-53
EXERCISE: BEARING STAKE DATE/TIME: 7-25-77 - 1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
48 ELEMENTS +24 DEG. A7 STEERING

INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING

140HZ

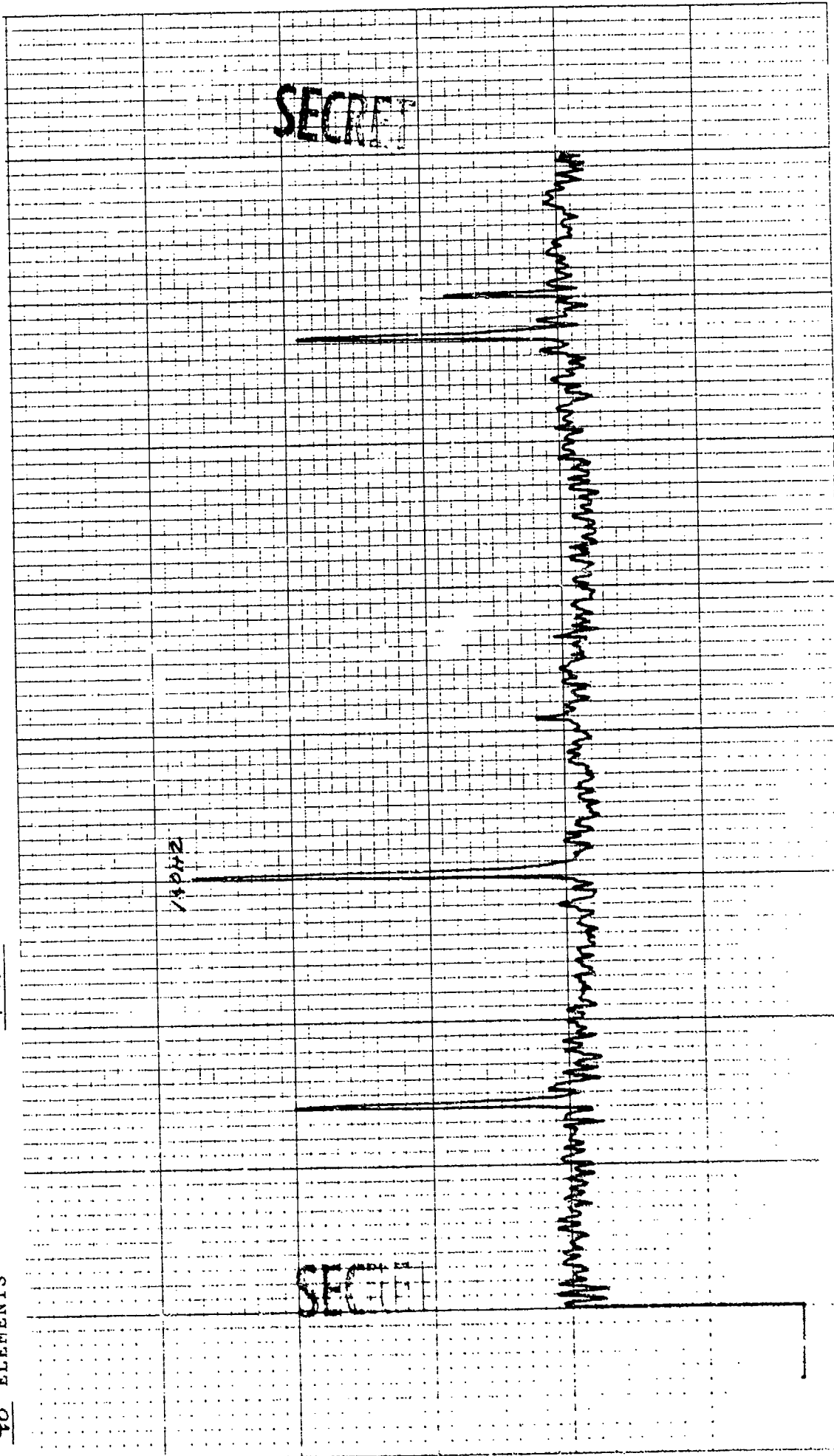
SECRET

SECRET

CONTROL: 150/ - 48 (DPE)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
48 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-6-79-14416-26-29-53)
DATE/TIME: 3-15-77 - 150/ Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 26 DEG. AZ STEERING

REEL: 44
INDE X 3000
INTEGRATION TIME 320 SECS
ATTN: -30 DB
FILTER
WTG: HANNING



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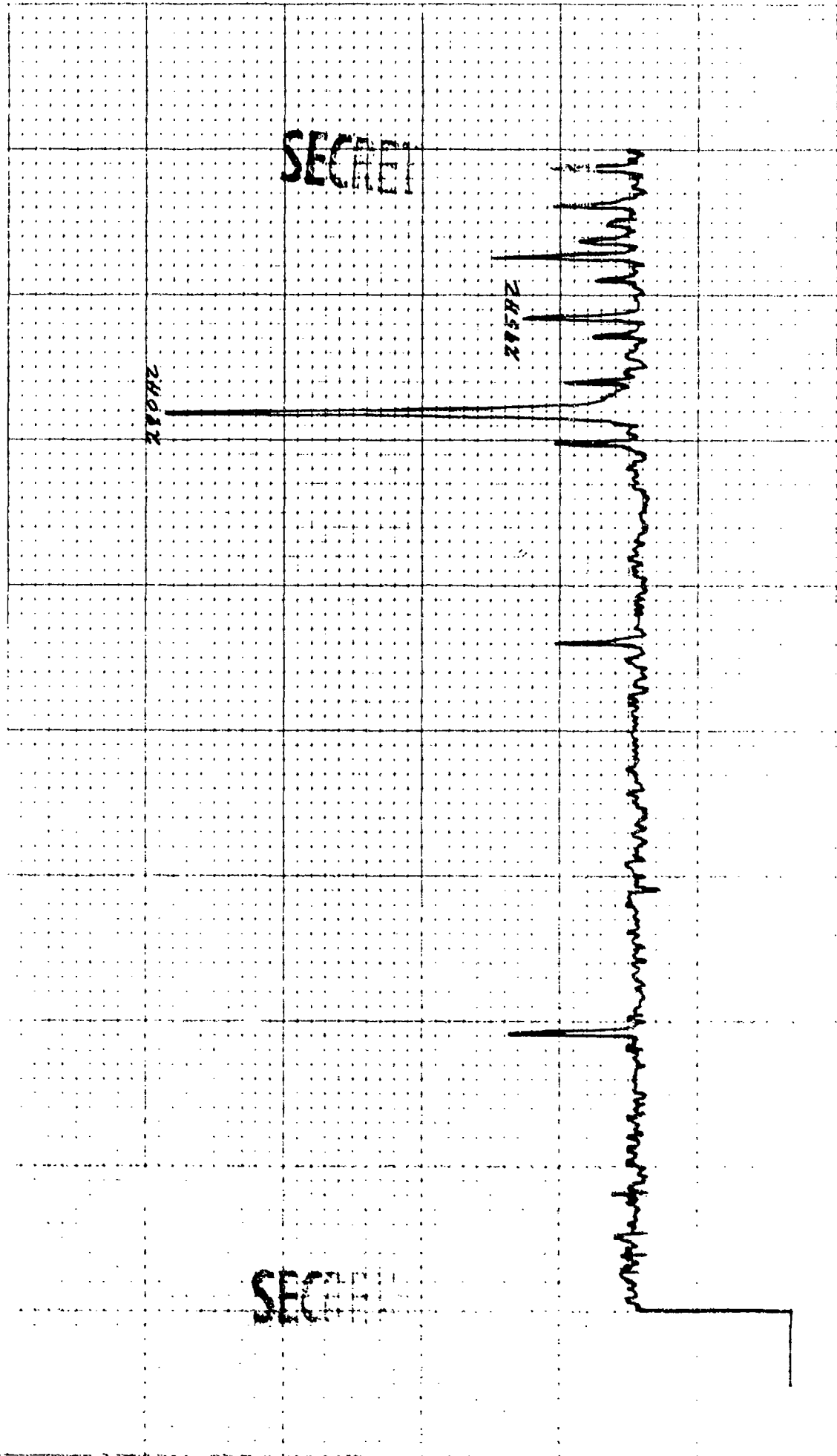
[Handwritten signature]

46 0703

CONTROL: 150/ -40 (DPE) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM(ELEMENTS) 1-649-144-264 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 -150/ 2
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
40 ELEMENTS +16 DEG. AZ STEERING

REEL: 44 INDE X7000

INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



45 0703

CONTROL: 1501 - 40 (D08)

CONTROL: 1501 - 40 (D08)
BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

48 ELEMENTS

DATE OF ANALYSIS: - - - - -
1-688-14816-26928-53)

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10HZ

+10 DEC. AZ STEERING

REEL: 44

INTEGRATION TIME 320 SECS

U.S. AIR FORCE

ATTN: -30 DB
WTG: HANNING

SECRET

SECRET

21042

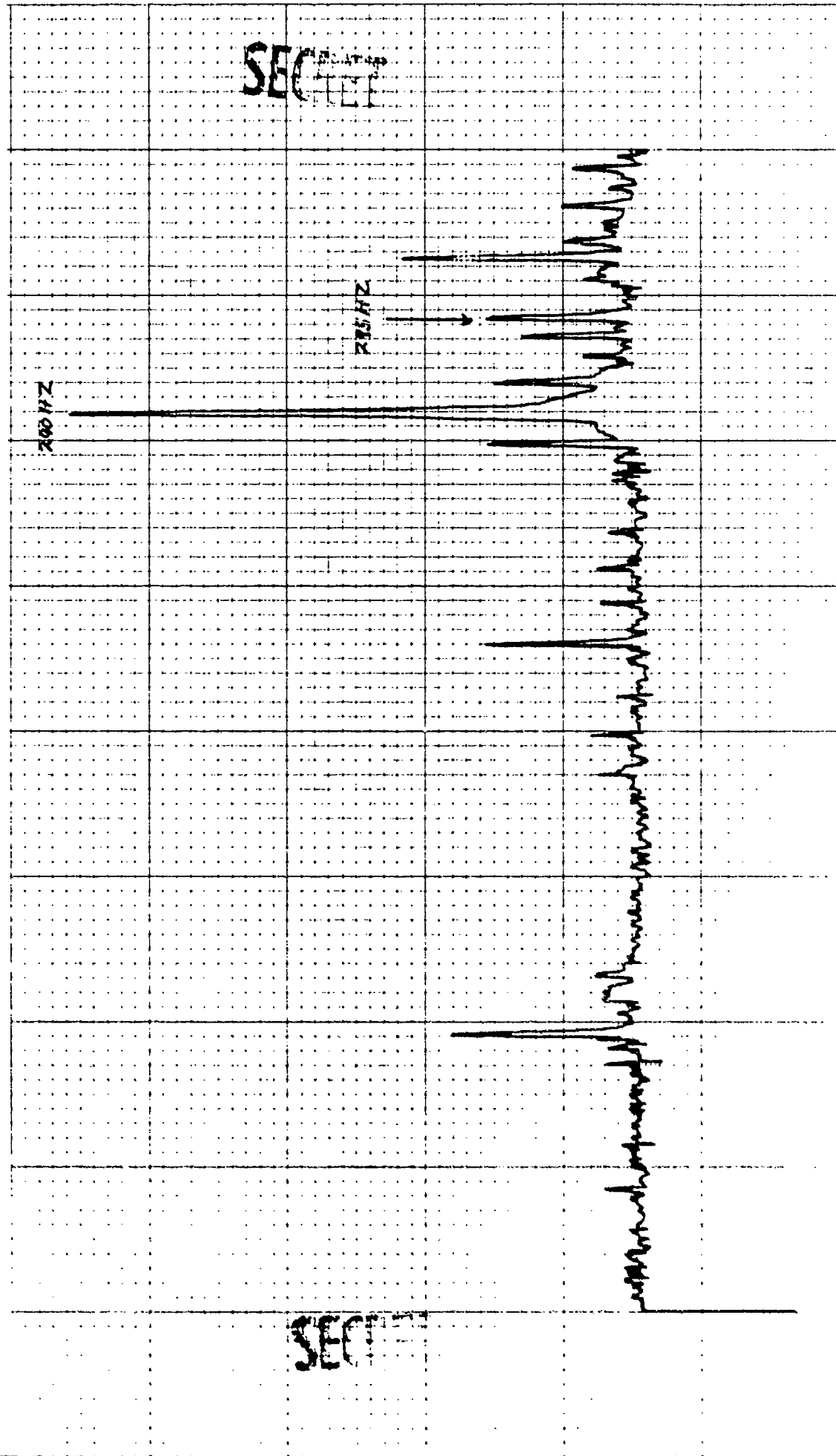
Zwischen

The very little of money that was spent on the
 road was for the purpose of getting the
 money out of the bank and putting it
 in the hands of the people.

1-2-77 19:20 TO THE HQ: 1-2-77

46 0703

CONTROL: 1501 - 48 (DP2) DATE OF ANALYSIS: _____ INDEX X 3000
BEAMFORMED SPECTRUM (ELEMENTS 1-64 9-144 16-264 28-53) REEL: M4
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
48 ELEMENTS +19 DEG. AZ STEERING

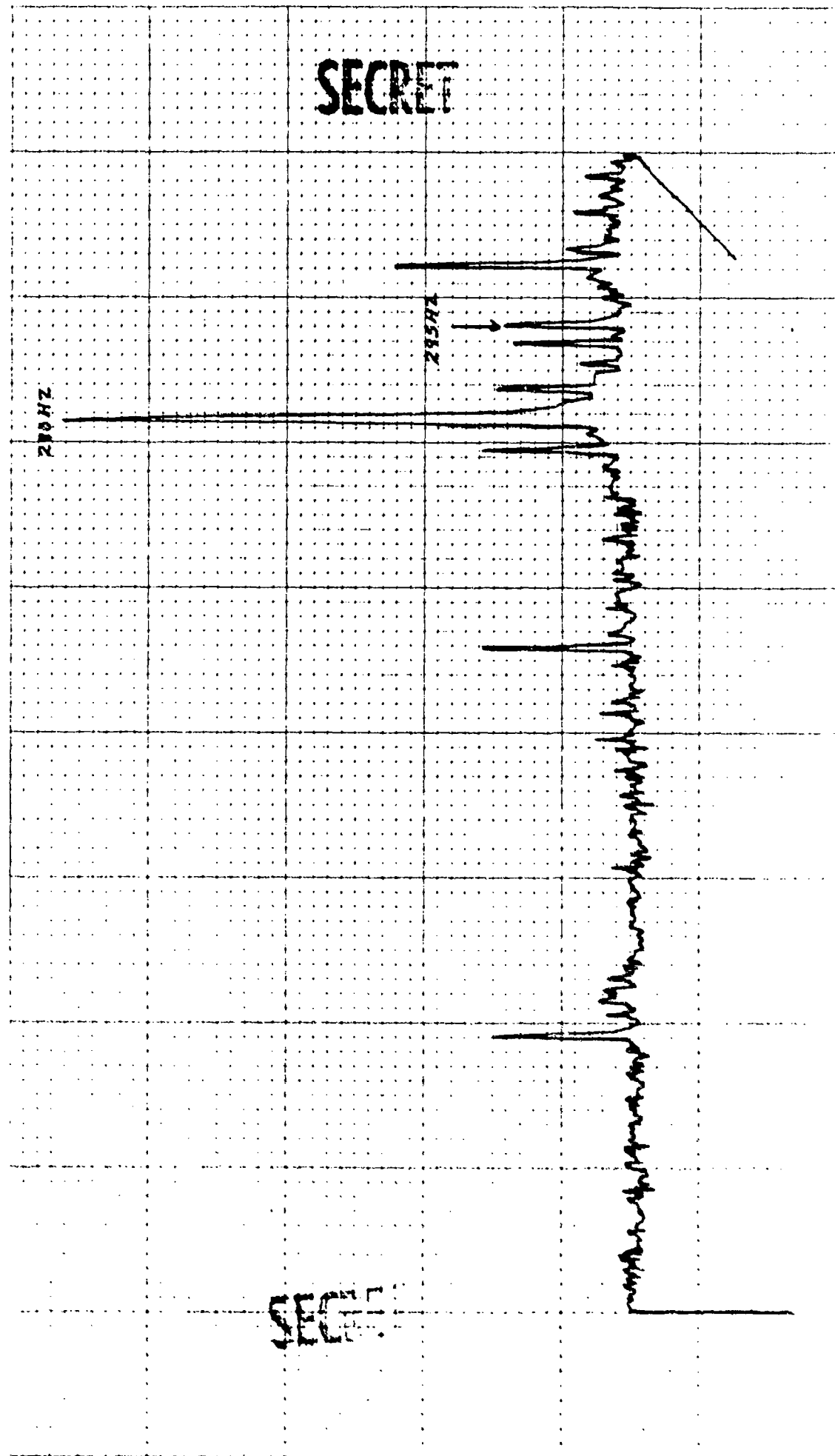


46 0703

CONTROL: 150 - 48 (008)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
48 ELEMENTS

DATE OF ANALYSIS: 1-24-77
DATE/TIME: 15-22-1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

REEL: MY INDE X 3000
INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILTER WTG: HANNING

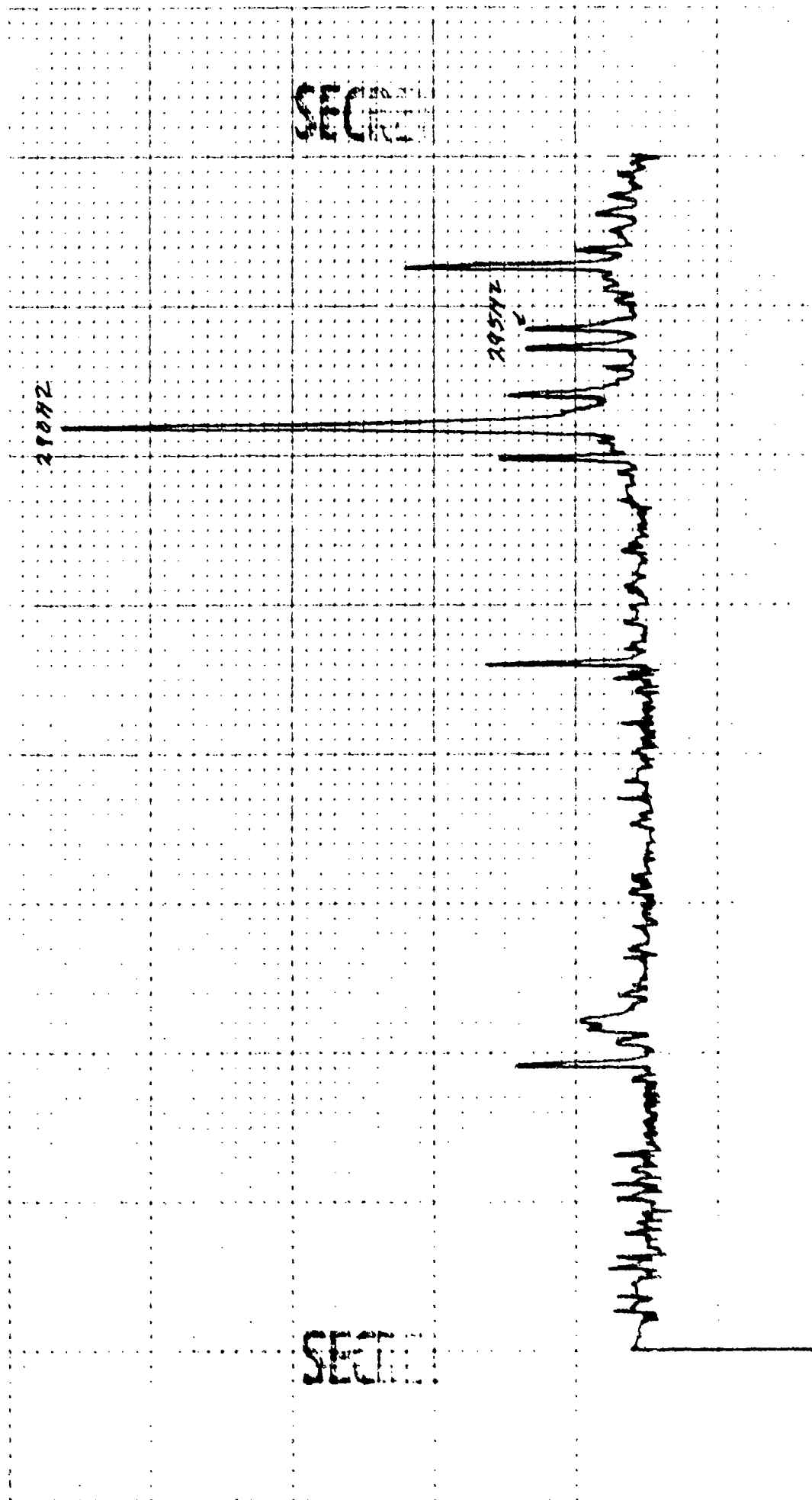


46 0703

CONTROL: 1501 - 48 (DSC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
48 ELEMENTS

DATE OF ANALYSIS: - - -
1-64 9-14 16-06 10-53
DATE/TIME: 7-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 21 DEG. AZ STEERING

REEL: 44 INDE XJ000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



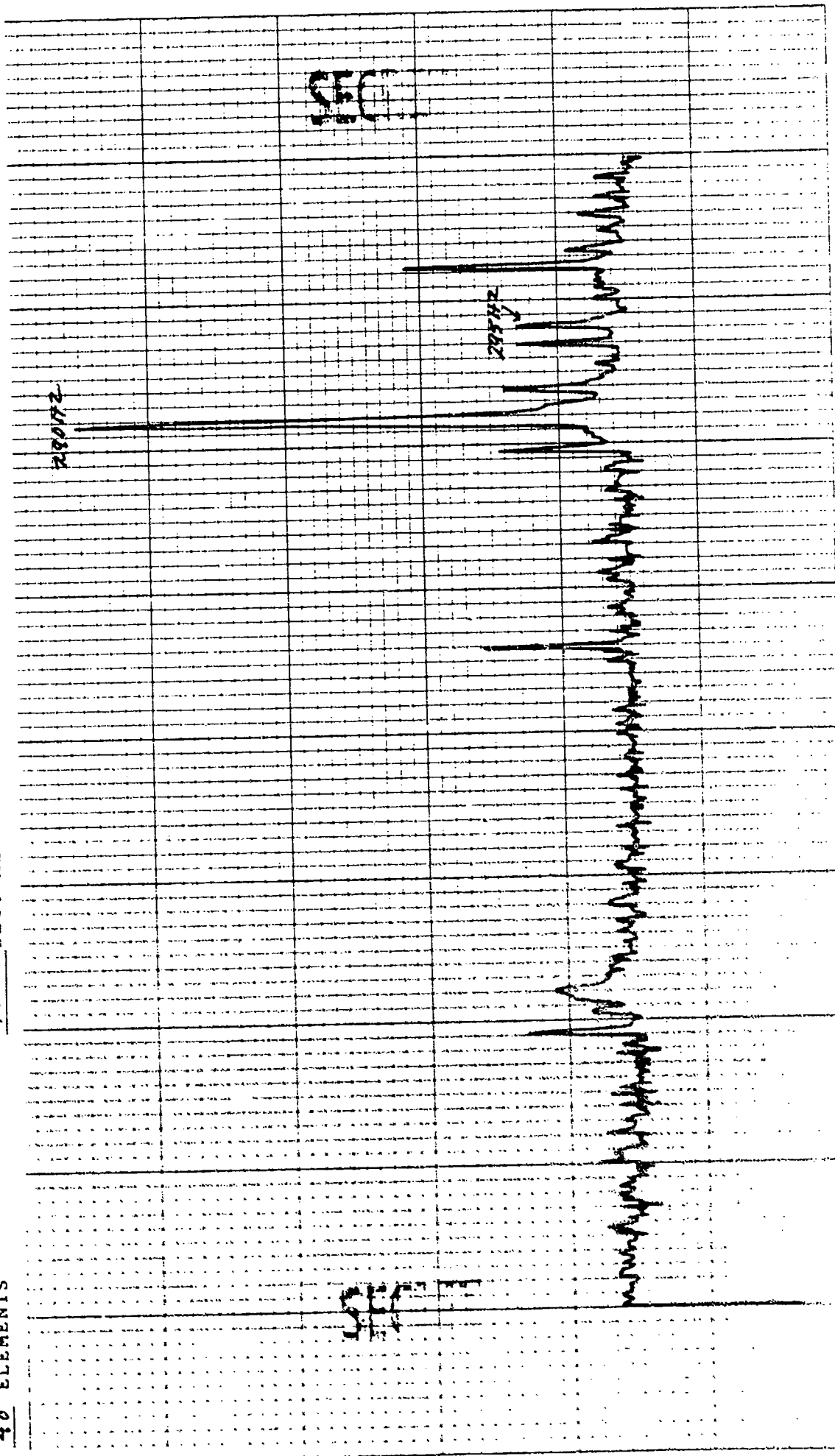
10 X 16 TO THE INCHES
KOE

46 0703

CONTROL: 1501 - 40 (DPE)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
40 ELEMENTS

DATE OF ANALYSIS: 1-688-14816-20-28-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+22 DEG. AZ STEERING

REEL: 144
INDE X 3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING



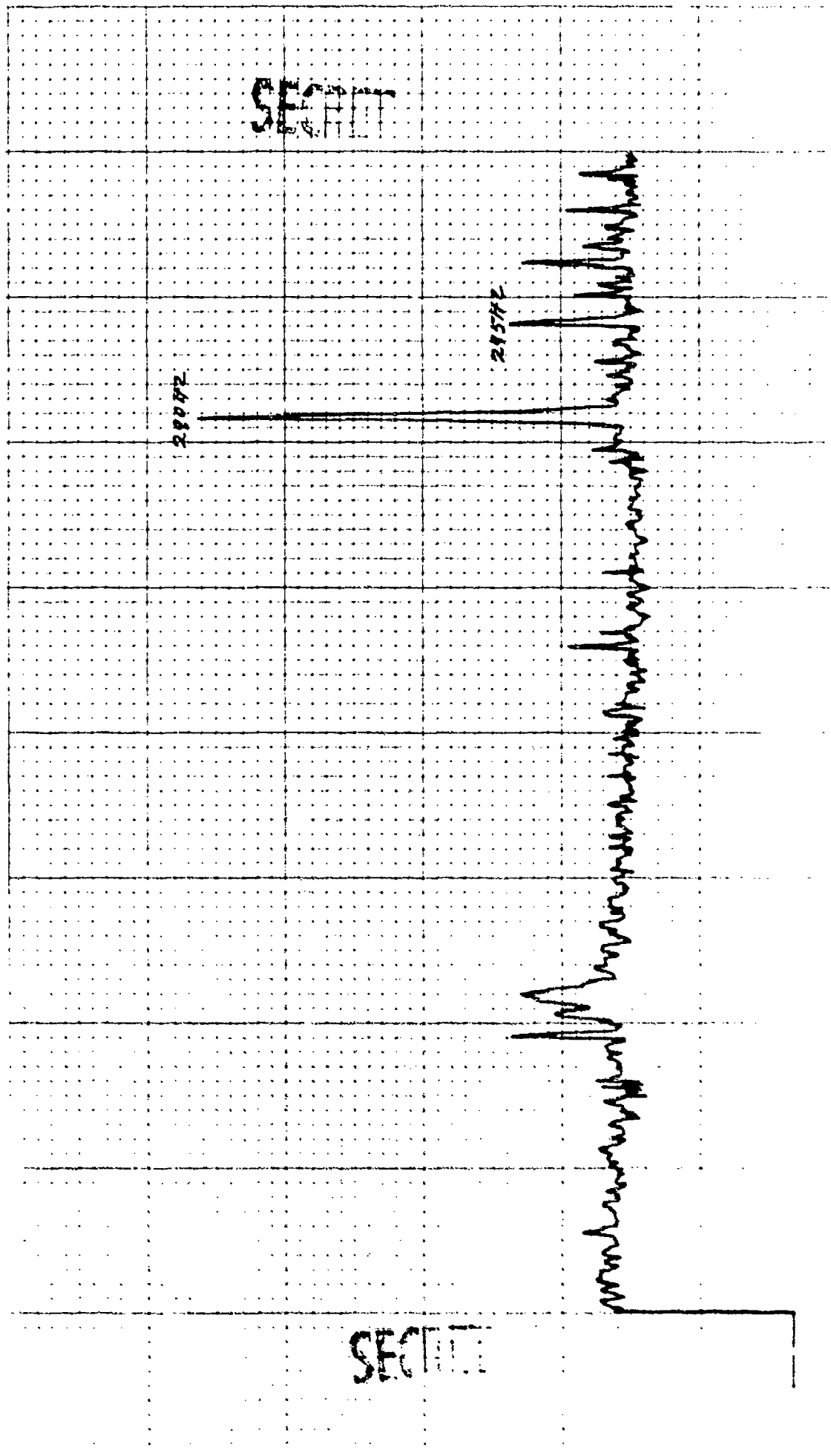
46 0703

CONTROL: 1501 - 40 (DB)
 BEAMFORMED SPECTRUM (ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 40 ELEMENTS

DATE OF ANALYSIS: 1-6-88
 DATE/TIME: 1400-26-88
 ANALYSIS BANDWIDTH: 1/10 HZ
 +24 DEG. AZ STEERING

REEL: 44
 INTEGRATION TIME 320 SECS
 ATTEN: -30 DB
 FILTER WIG: HANNING

INDE X3000

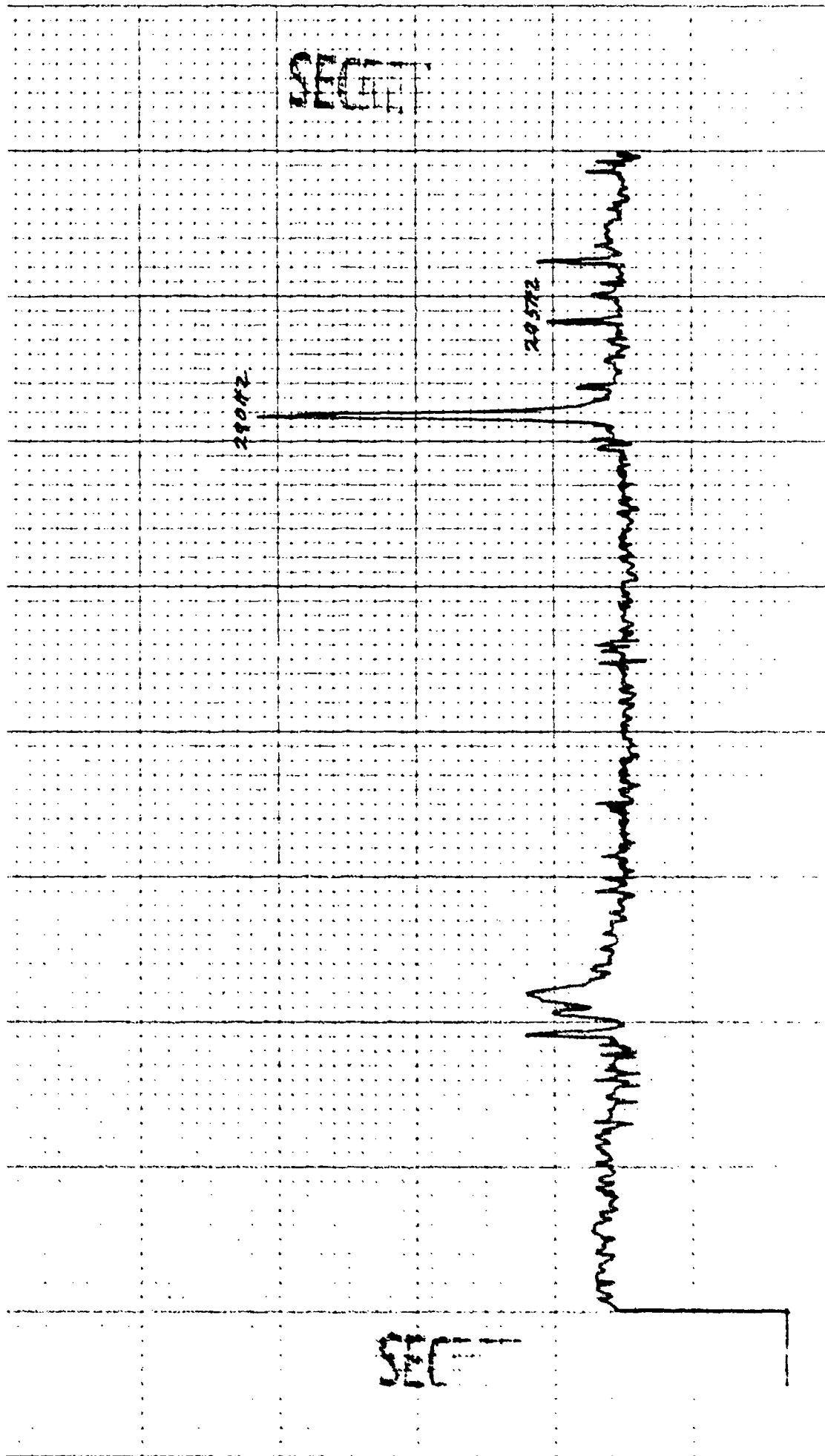


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10-2-77 10:00 AM 10:00 AM 10:00 AM

46 0703

CONTROL: 1501 - 40 (D00) DATE OF ANALYSIS: 1-2-77 10:00 AM 10:00 AM 10:00 AM
BEAMFORMED SPECTRUM(ELEMENTS) REEL: 44 INDE X3000
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTFR WTG: HANNING
40 ELEMENTS +26 DEC. AZ STEERING



NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 9 DATE 3-15-77 TIME 2131Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\text{dBV} \frac{1}{10}$ ABW	<u>-52.0</u>
SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$	<u>-(-12) = -40.0</u>
BANDWIDTH CONVERSION TO 1 HZ BAND	<u>+8.2 = -31.8</u>
CONVERSION TO $\text{dBrePa}/1\text{Hz}$	<u>+100 = +68.2</u>

UNCLASSIFIED

UNCLASSIFIED

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 9 DATE 3-15-77 TIME 2131Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL dBV 11.0
ABW

SYSTEM SENSITIVITY dB/μB

BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO dBrePa/1HZ

-51.0

-(-9) -43.0

+8.2 -34.8

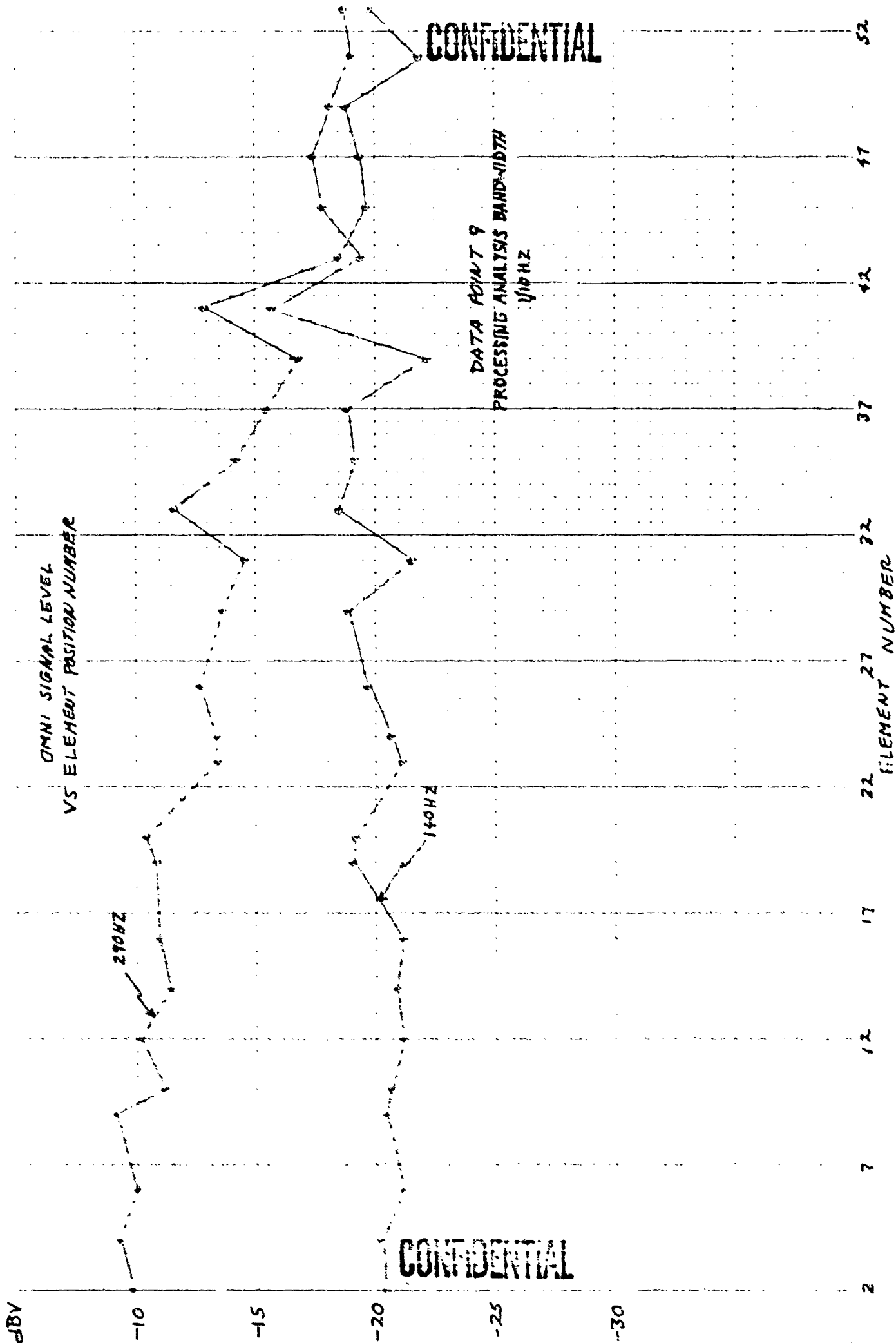
+160 +65.2

UNCLASSIFIED

UNCLASSIFIED

46 0703

103 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52



162 2213 2100 0000

46 0703

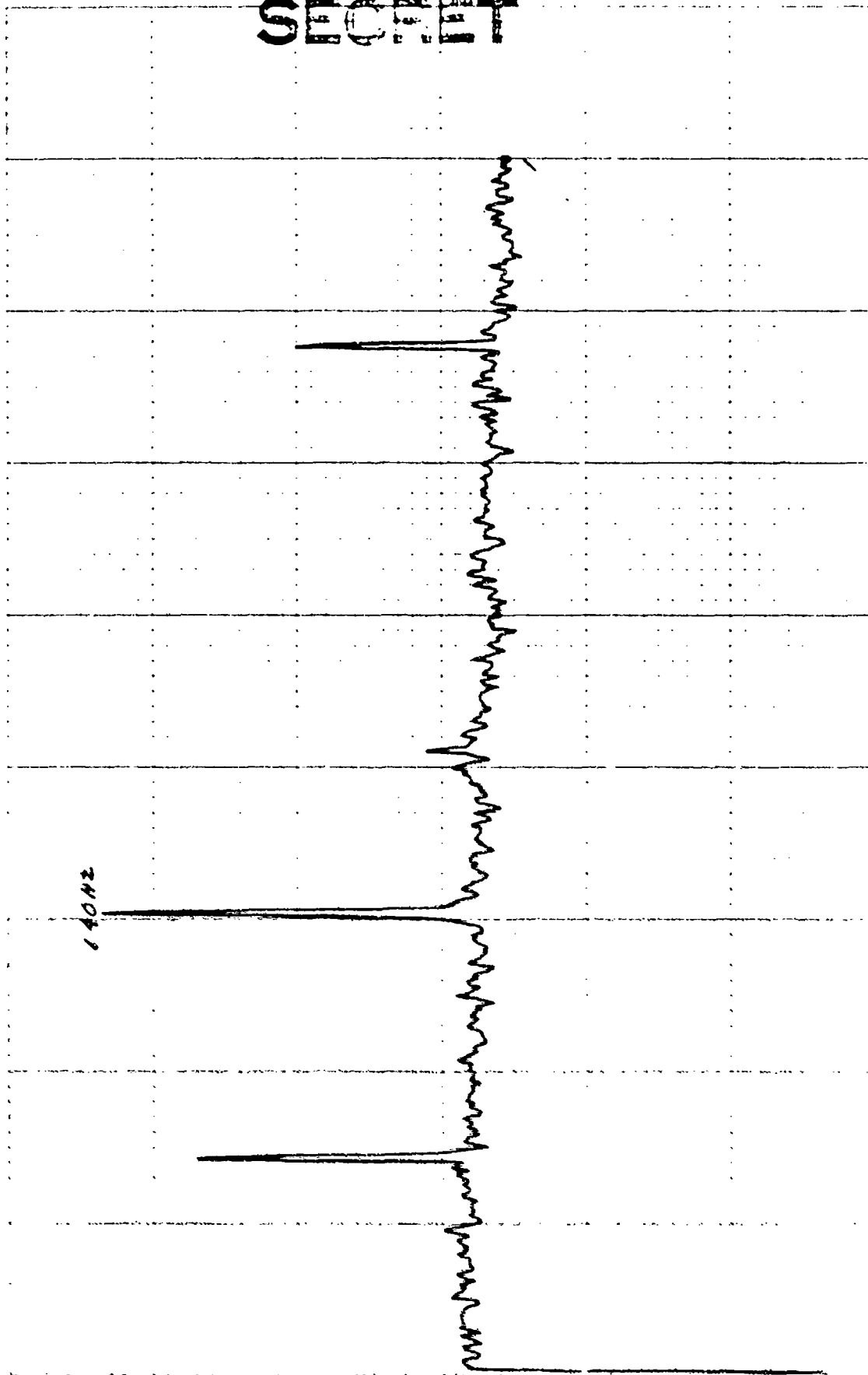
CONTROL: 3-15-2131 (27)
OMNI SPECTRUM(ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: N10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTC: HANNING

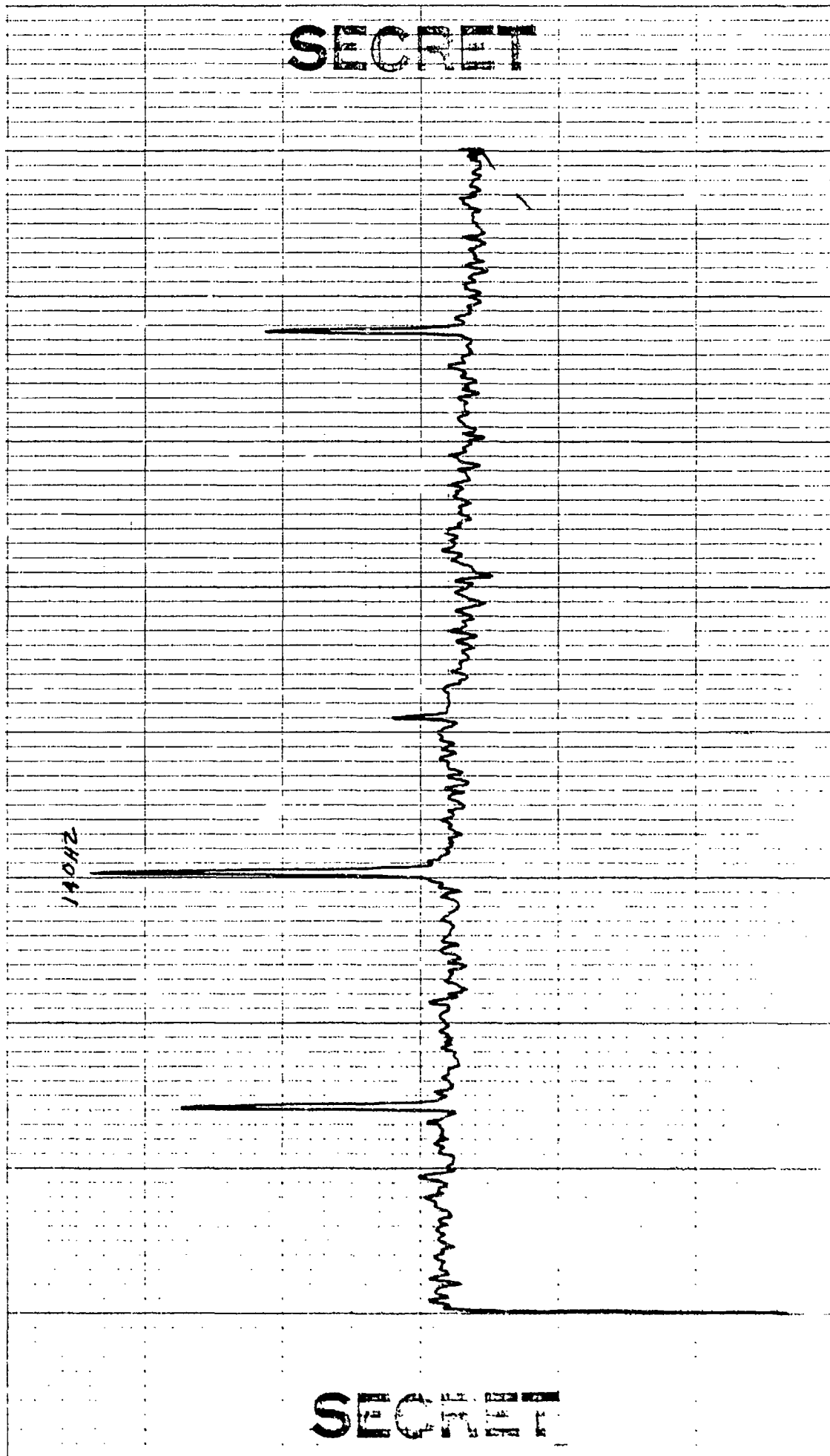


SECRET

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CONTROL: 3-15-2131 (28) DATE OF ANALYSIS: REEL: 410 INDEX 3620
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT
 INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WT: HANNING

DATE/TIME: 2-15-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 ——— DEC AZ STEERING



SECRET

46 0703

CONTROL: 345 - 2131 (29) REEL: M10 INDEX 3620
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
DATE OF ANALYSIS:
DATE/TIME: 34577 - 24312
ANALYSIS BANDWIDTH: 1110 HZ
INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING
DEG AZ STEERING

140 HZ

SECRET

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46 0703

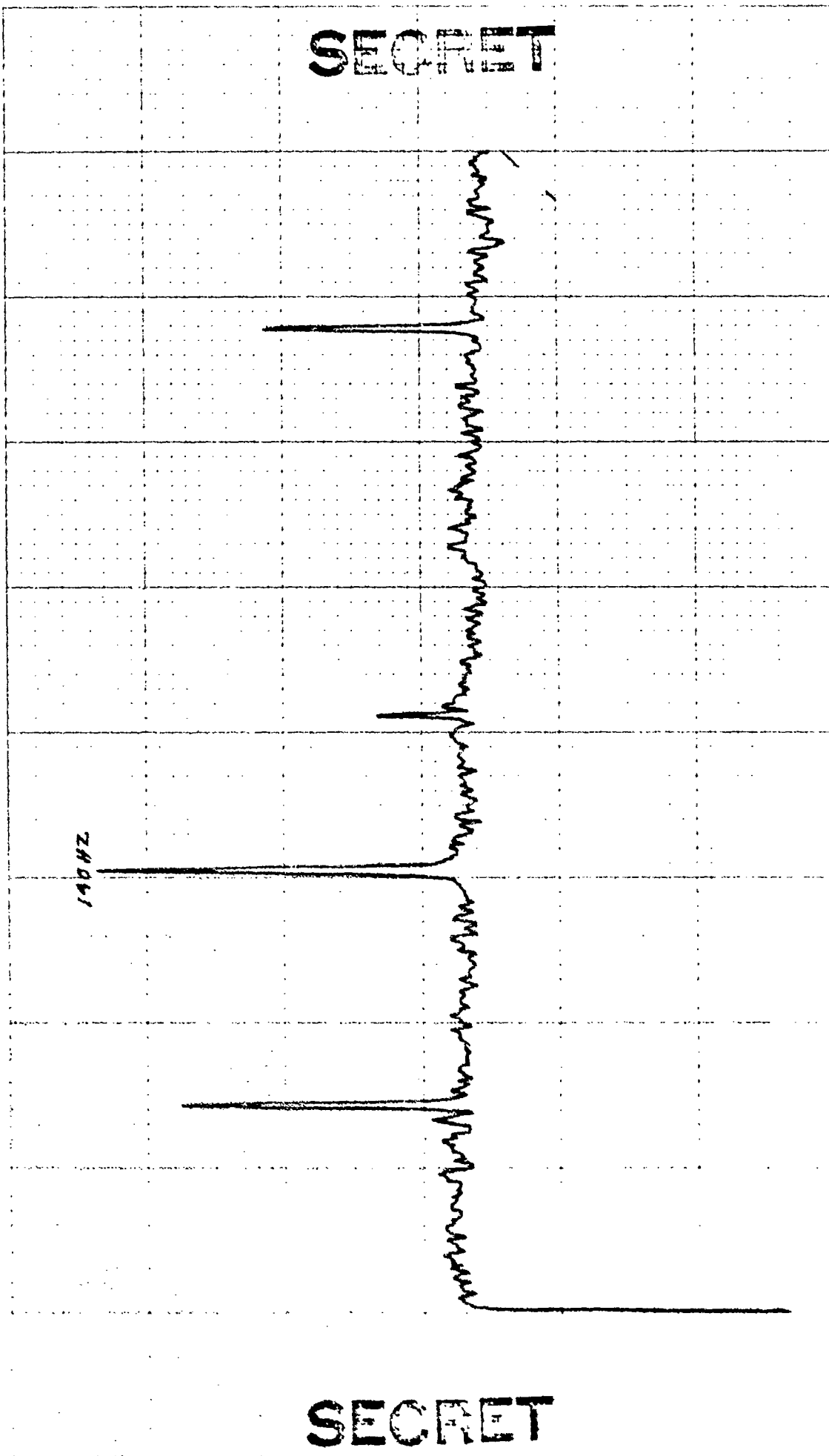
CONTROL: 3-15-2031 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2031Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: H10 INDEX: 3020

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



46 0703

CONTROL: 375-2131 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M10

INDEX 3620

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

ATTEN: — DB

140HZ

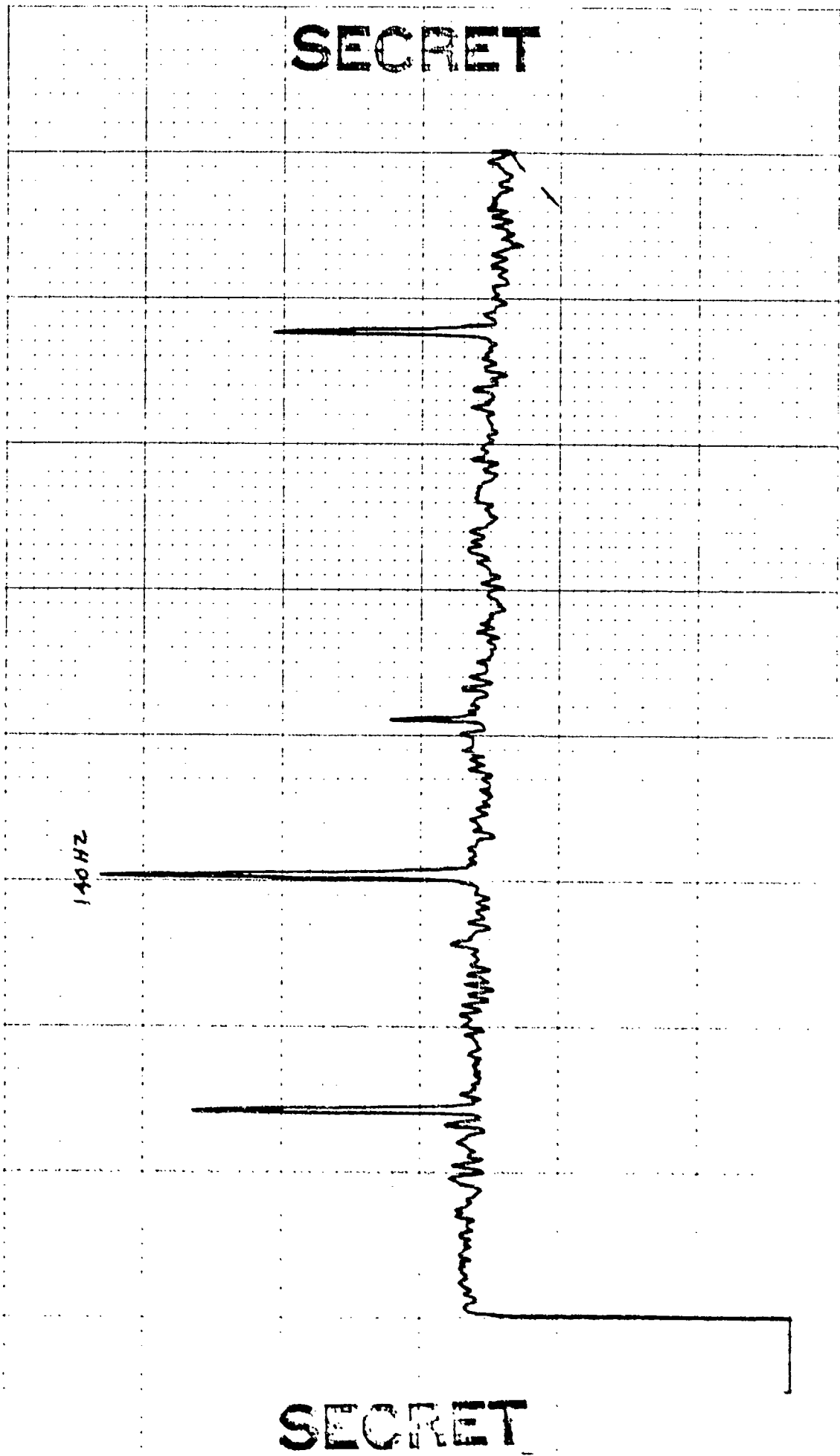
SECRET

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46 0703

Page 2 of 2

CONTROL: 345-2/31 (12) DATE OF ANALYSIS: REEL: A10 INDEX J620
OMNI SPECTRUM (ELEMENT 12) DATE/TIME: 345-77 - 2031 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
CENTER FREQ: 150 HZ DEG AZ STEERING FILTER WTG: HANNING
1 ELEMENT



SECRET

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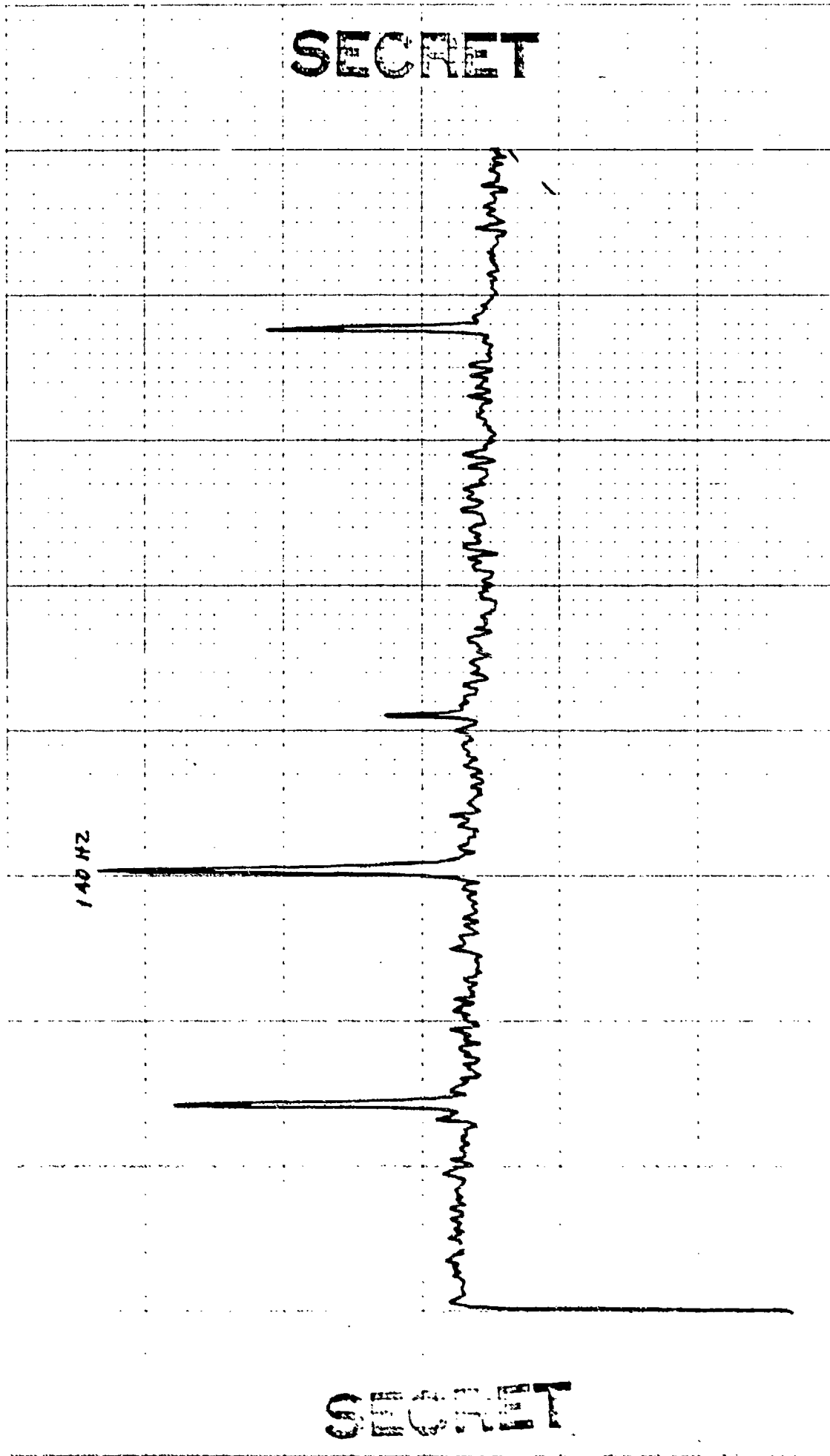
CONTROL: 3-15 - 2131 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: K10 INDEX: 3620

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTC: HANNING

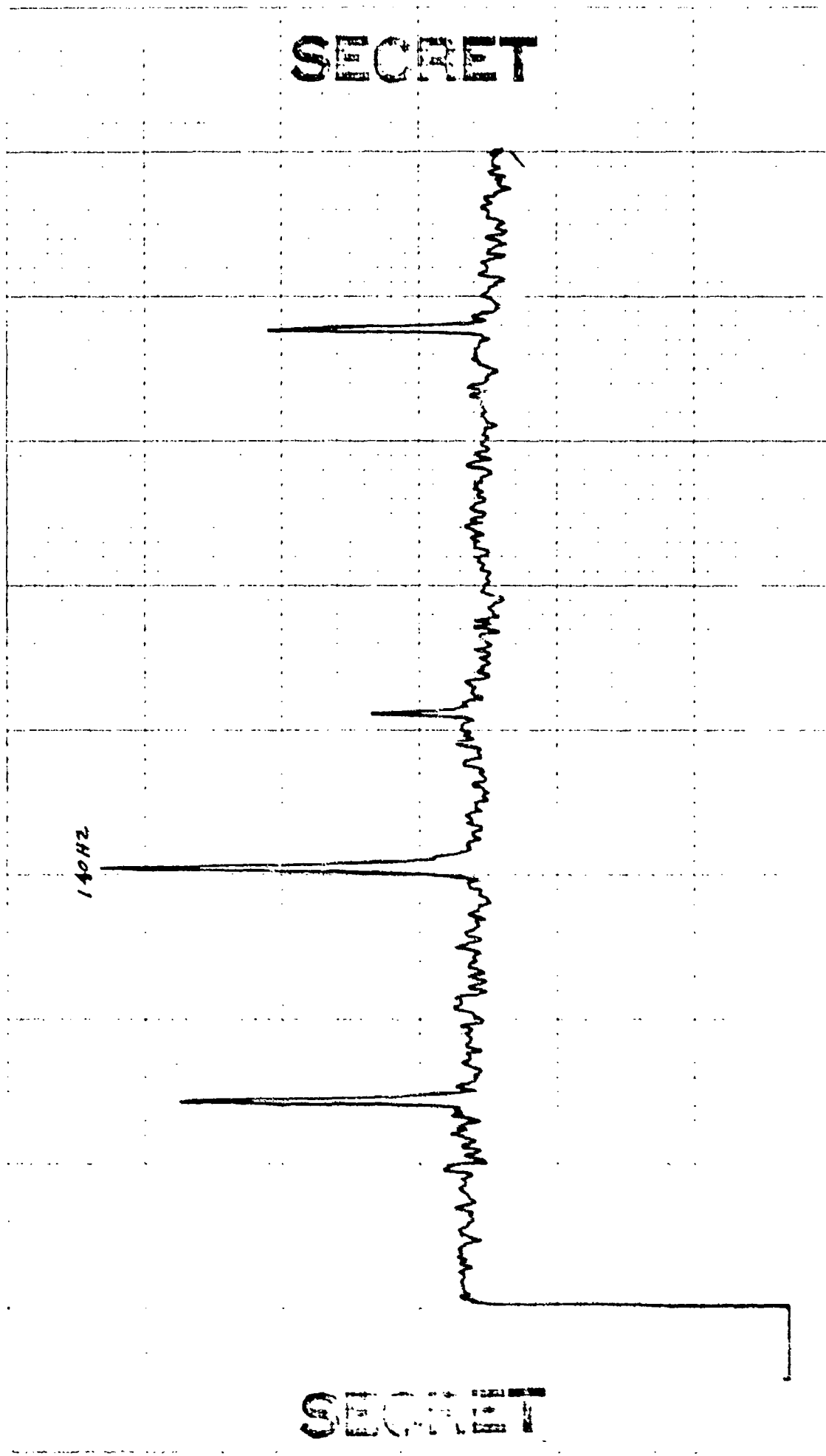


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46 0703

CONTROL: 3-15 - 2431 (34) (74) INDEX: 410 REEL: 410 INDEX: 3620
GMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
DATE/TIME: 3-5-77 - 2137Z INTEGRATION TIME 320 SECS ATTEN: DB
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WIG: HANNING
_____ DEG AZ STEERING



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160E 24000 KHz 100 dB 100 Hz

46 0703

CONTROL: 3-15 - 2431 (35)
OMNI SPECTRUM (ELEMENT 18)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2431 Z

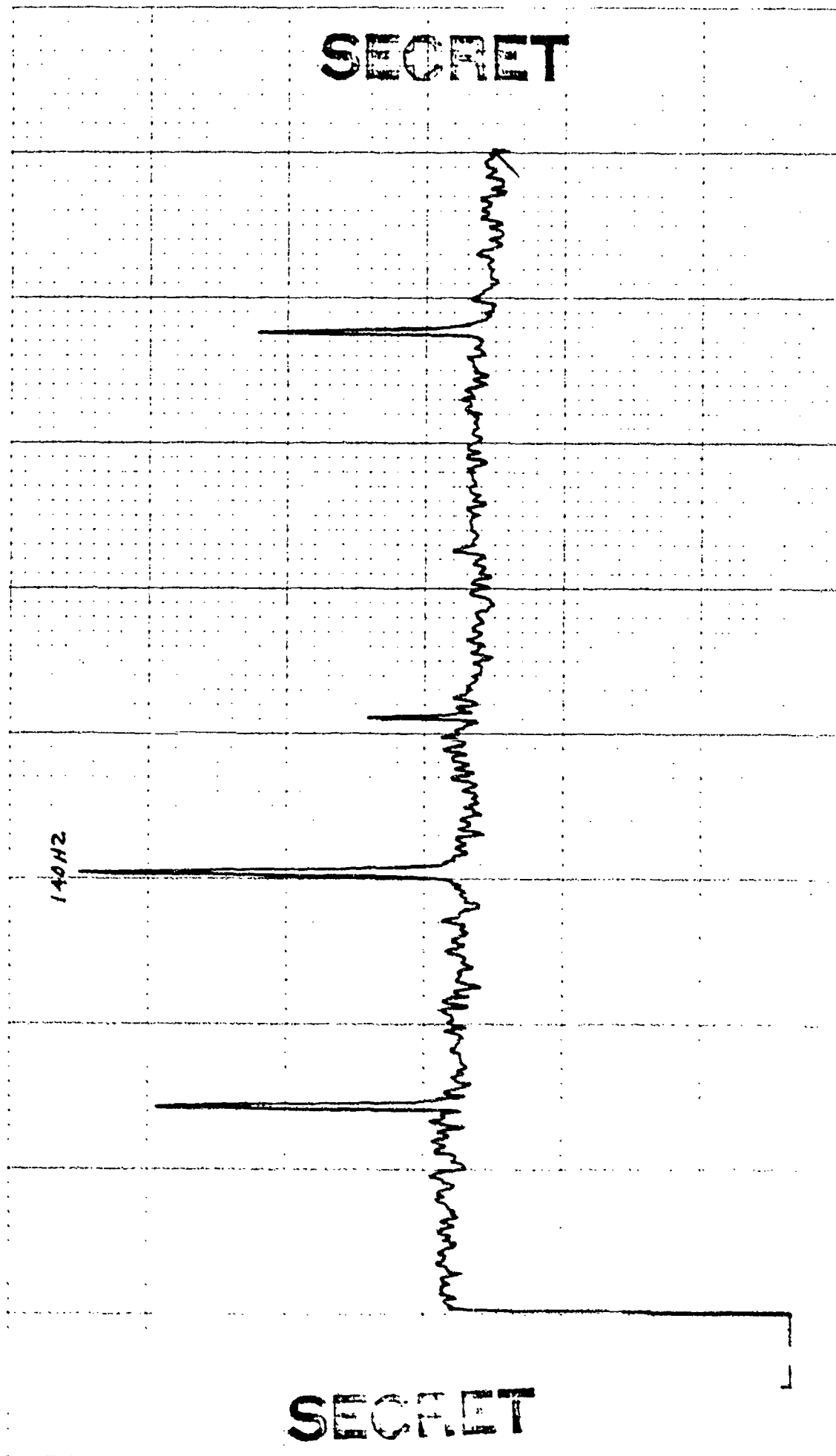
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: M10

INDEX 3620

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTN: — DB



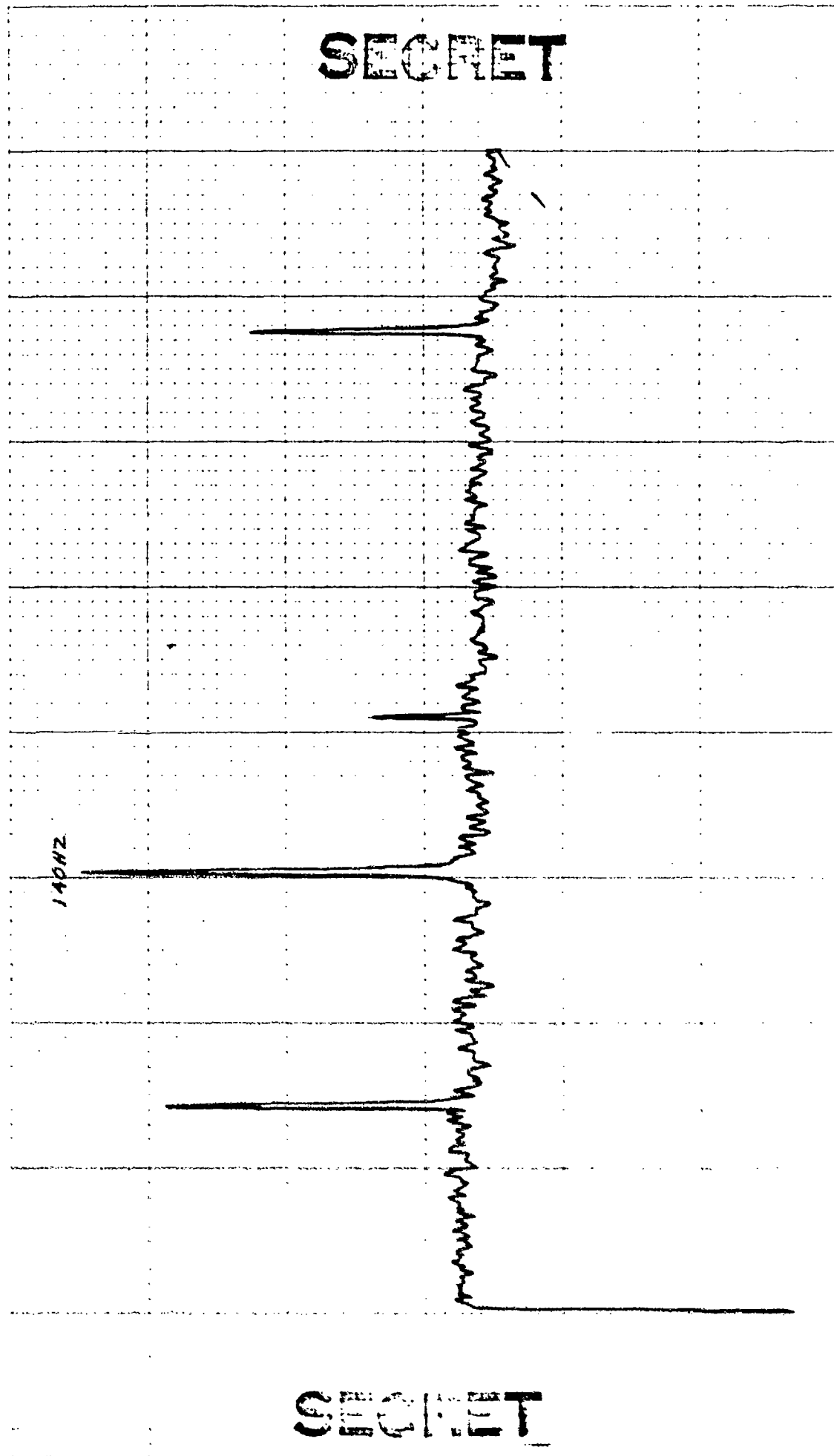
THE UNIVERSITY OF CHICAGO

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
~~~~~ DEC AZ STEERING

REEL: M10 INDEX 3020

INTEGRATION TIME 320 SECS ATTN: — DB  
FILTER WTG: HANNING



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46 0703

CONTROL: 3-15 - 2/31 (17)  
OMNI SPECTRUM (ELEMENT 23)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

REEL: 110 INDEX 3620

DATE/TIME: 3-5-77 - 21/ 2  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING  
ATTEN: — DB

140 HZ

SECRET

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46 0703

CONTROL: 3-15 - 2127 (18)  
OMNI SPECTRUM (ELEMENT 24)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

REEL: N10 INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER  
ATTN: — DB  
WTG: HANNING

140HZ

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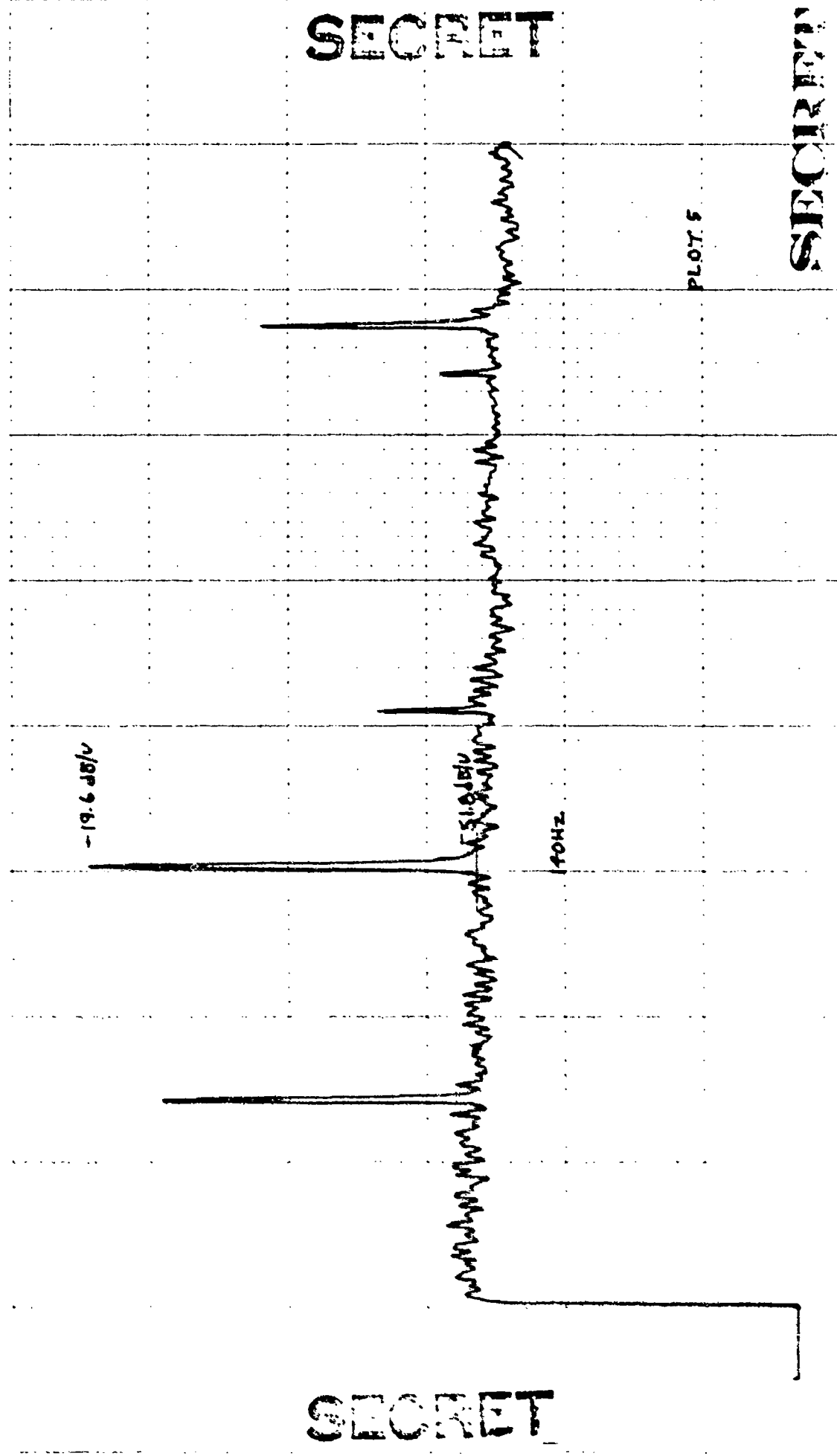
CONTROL: 2/31 - 5/ (DPY)  
OMNI SPECTRUM (ELEMENT 26)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: MIO INDEX 3420

INTEGRATION TIME 320 SECS ATTN: - DB  
FILTER WTC: HANNING



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100 HZ

150 HZ

180 HZ

46 0703

CONTROL: 3-15 - 213/ ( 40 )  
OMNI SPECTRUM (ELEMENT 29)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEC AZ STEERING

REEL: 110

INDEX 3020

INTEGRATION TIME 320 SECS  
FILTER  
ATTN: — DB  
WTG: HANNING

140HZ

SECRET

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1.  $\sum_{i=1}^n x_i^2 = 1$

REEL: 110 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: DB

FILTER WTG: HANNING

DATE OF ANALYSIS:  
DATE/TIME: 3-5-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEC AZ STEERING

1904

**SECRET**

**SECRET**

CONTROL: 345-2021 (42)  
 QMNI SPECTRUM (ELEMENT 33)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-45-77 - 2131 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 ———— DEG AZ SLEEPING

REEL: M10INDEX: 3620

INTEGRATION TIME 320 SECS  
 FILTER  
 ATTN: — DB  
 WTG: HANNING

140 HZ

SECRET

SECRET

45 0703

CONTROL: 2/31 - 5/ (089)  
OMNI SPECIFICUM (ELEMENT 35)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 152 HZ  
1 ELEMENT

DATE OF ANALYSIS:

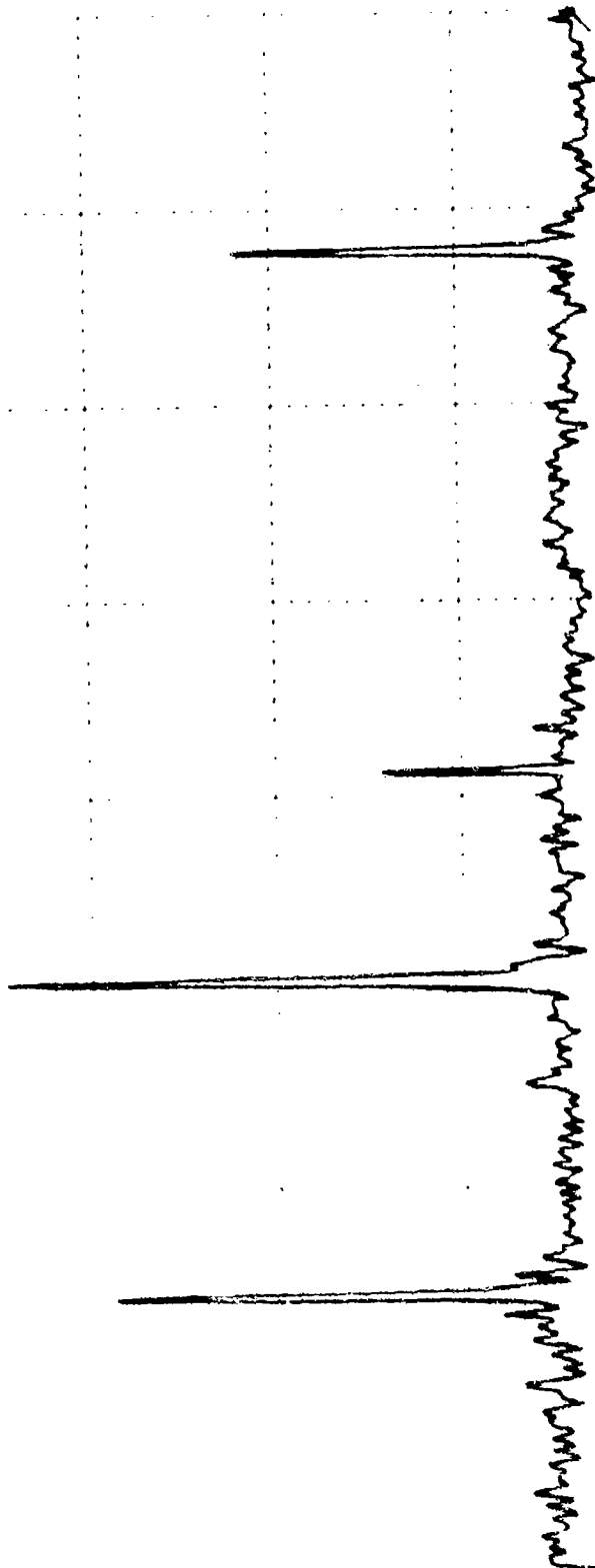
DATE/TIME: 3-18-72 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
- DEG AZ STEERING

REEL: M10

INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: - DB  
WTG: HANNING

170 HZ



SECRET

SECRET

46 0703

CONTROL: 3-45 - 2131 (44)  
OMNI SPECTRUM (ELEMENT 37)  
EXEPCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-45-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: 1410

INDEX 3620

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTC: HANNING

140 HZ

SECRET

SECRET

46 0703

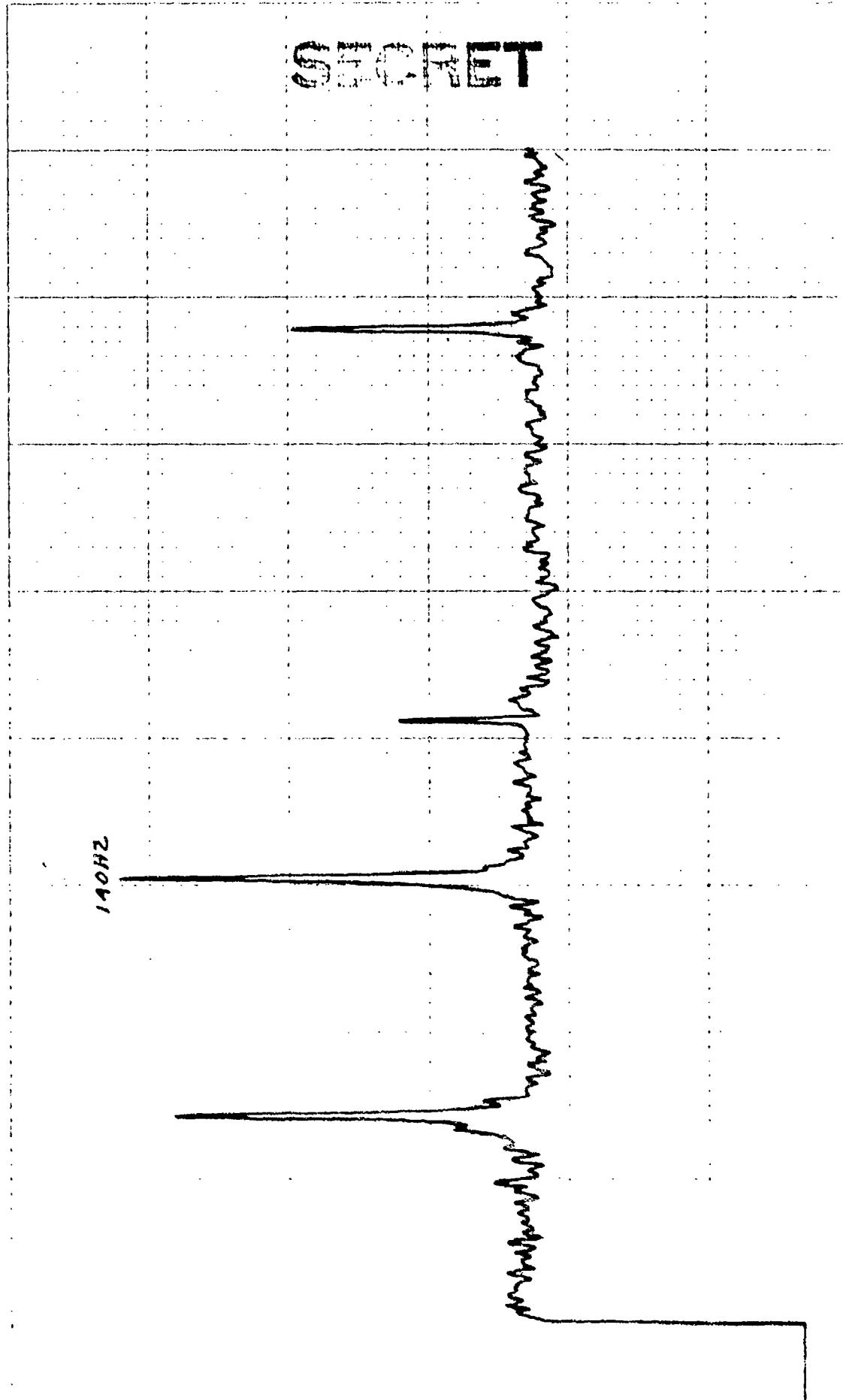
CONTROL: 3-5 - 2/31 (45)  
OMNI SPECTRUM (ELEMENT 39)  
EXERCISE: BEARING STAYE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: 110 INDEX 3620

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTC: HANNING



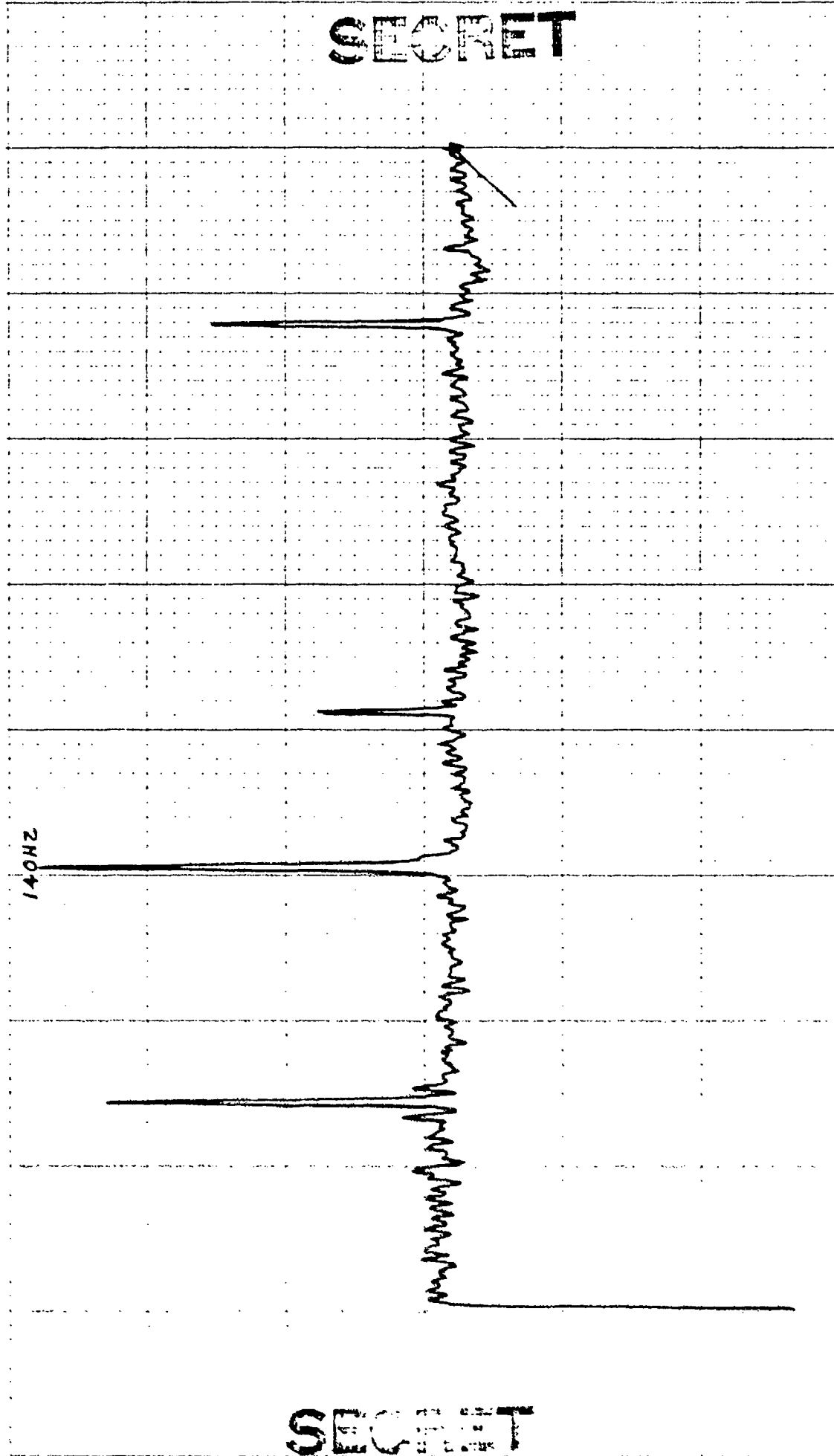
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46 0703

CONTROL: 3-45 -2131 (41) DATE OF ANALYSIS: REEL: M10 INDEX 3620  
OMNI SPECTRUM (ELEMENT 41)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
INTEGRATION TIME 320 SECS ATTN: — DB  
FILTER WTG: HANNING  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING



46 0703

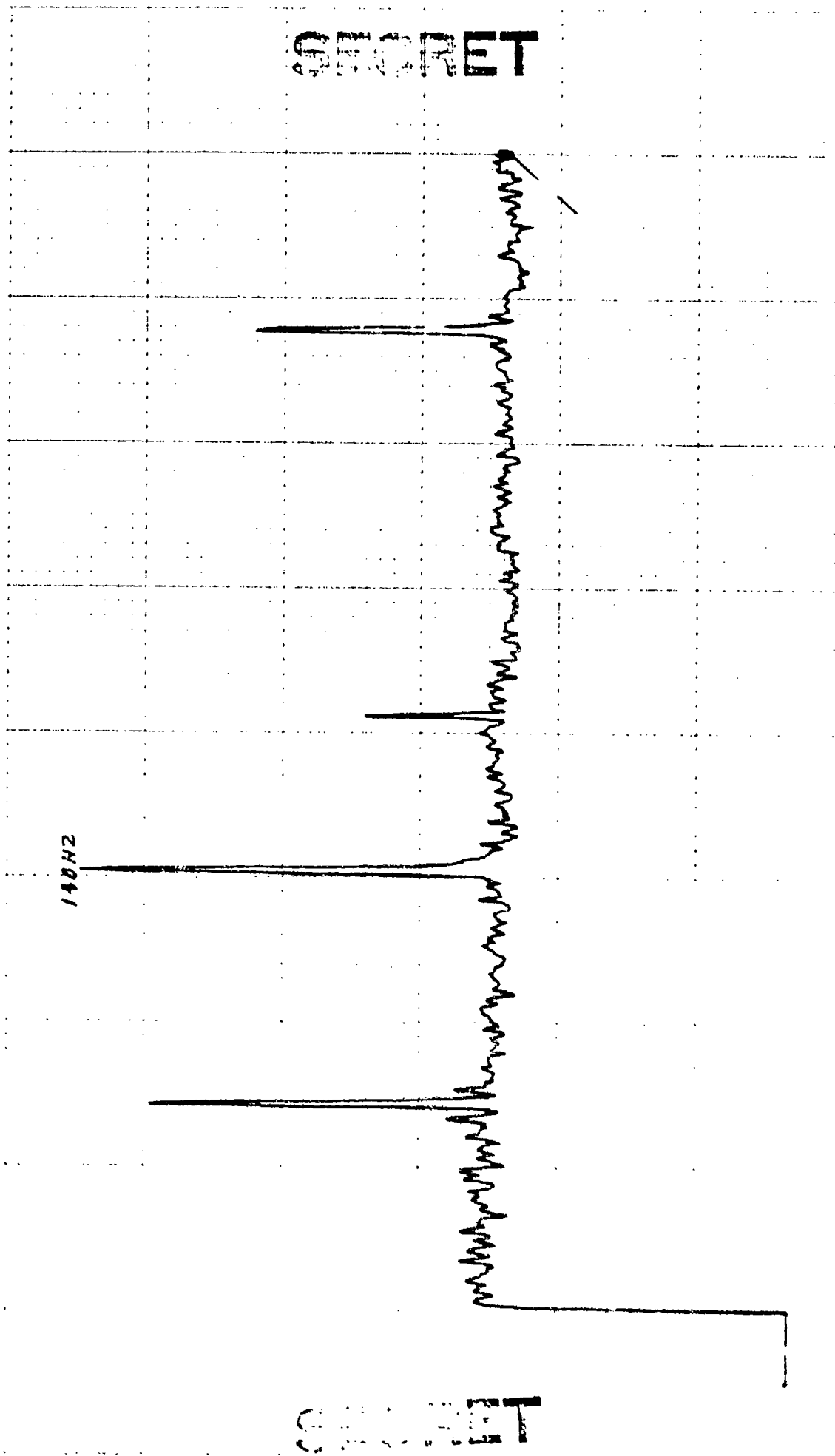
CONTROL: 3-15 - 2/31 (47)  
OMNI SPECTRUM(ELEMENT 43)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

REEL: 1410 INDEX 3620

INTEGRATION TIME 320 SECS  
ATTEN: - DB  
FILTER WTG: HANNING



46 0703

CONTROL: 3-15 - 2121 (40)  
OMNI SPECTRUM(ELEMENT 45)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

REEL: H10

INDEX 3/20

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTG: HANNING

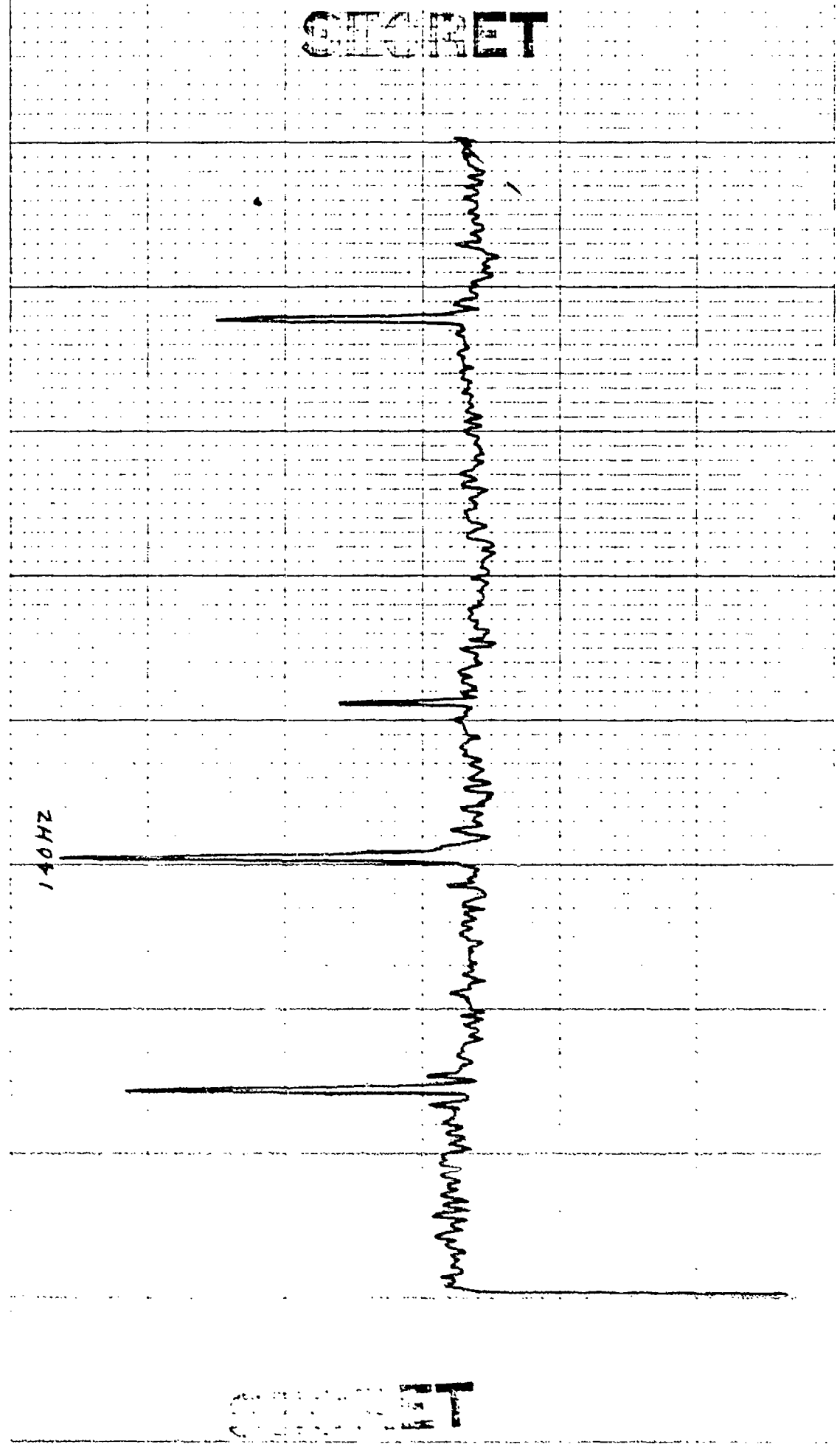
140 HZ

SECRET

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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

DATE OF ANALYSIS: DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
--- DEC A2 STEERING  
INTEGRATION TIME 320 SECS ATTN: --- DB  
REEL: M10 INDEX 3620  
FILTER WTG: HANNING



46 0703

CONTROL: 3-15 - 2131 (50)  
OMNI SPECTRUM (ELEMENT 49)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: M10

INDEX: 7620

INTEGRATION TIME 320 SECS ATTN: - DB  
FILTER WTC: LANNING

150 HZ

SECRET

SECRET

46 0703

CONTROL: 3-15 - 213 (51)  
OMNI SPECTRUM (ELEMENT 51)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: H10

INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER

ATTEN: ~ DB  
WTG: HANNING

140 HZ

SECRET

SECRET

46 0703

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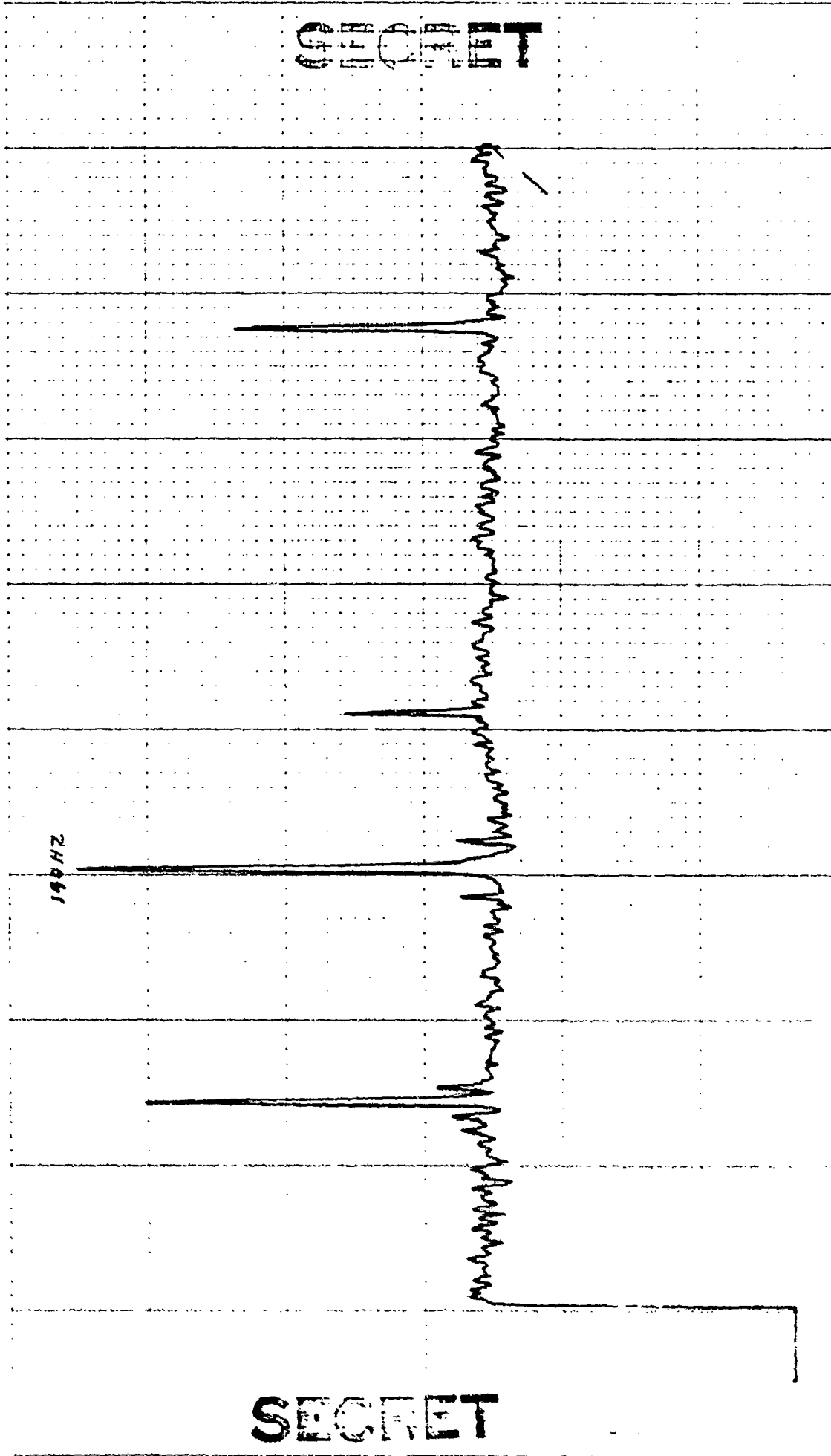
CONTROL: 3-15 - 2131 (52)  
OMNI SPECTRUM (ELEMENT 53)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

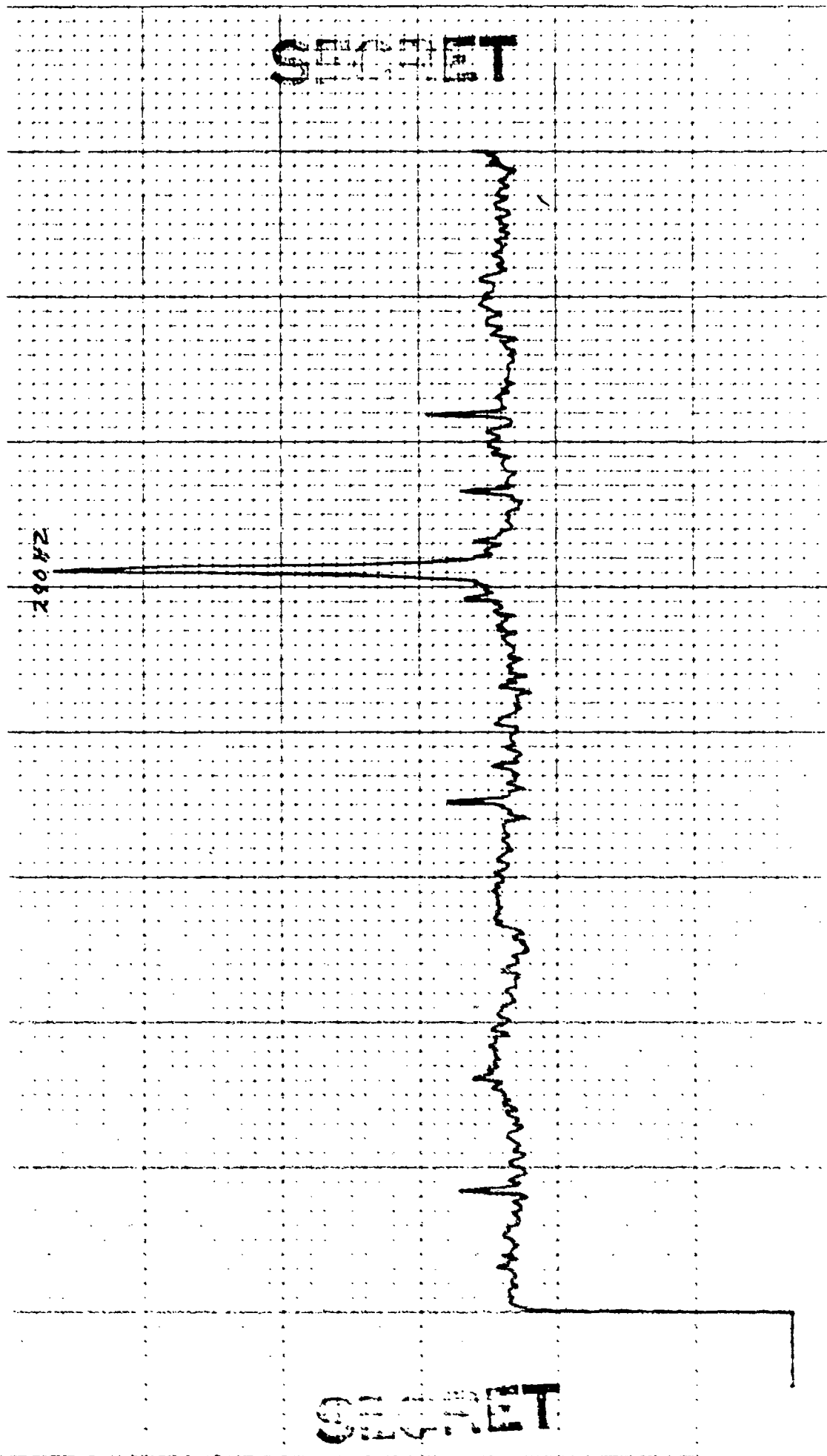
REEL: 1910 INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: — DB  
WTG: HANNING



46 0703

CONTROL: 3-15 - 2131 (53 ) REEL: M10 INDEX 3620  
OMNI SPECTRUM (ELEMENT 2)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
DATE OF ANALYSIS:  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING  
INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER  
WTC: HANNING





46,0703

INDEX 3620

REEL: 410

DATE OF ANALYSIS:

CONTROL: 3-75-2171 (54)  
OMNI SPECTRUM (ELEMENT 4)

EXERCISE: BEARING STAYE

CENTER FREQ: 200 HZ

1 ELEMENT

DATE/TIME: 2-5-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: — DB  
WTC: HANNING

240 HZ

SECRET

SECRET

46 0703

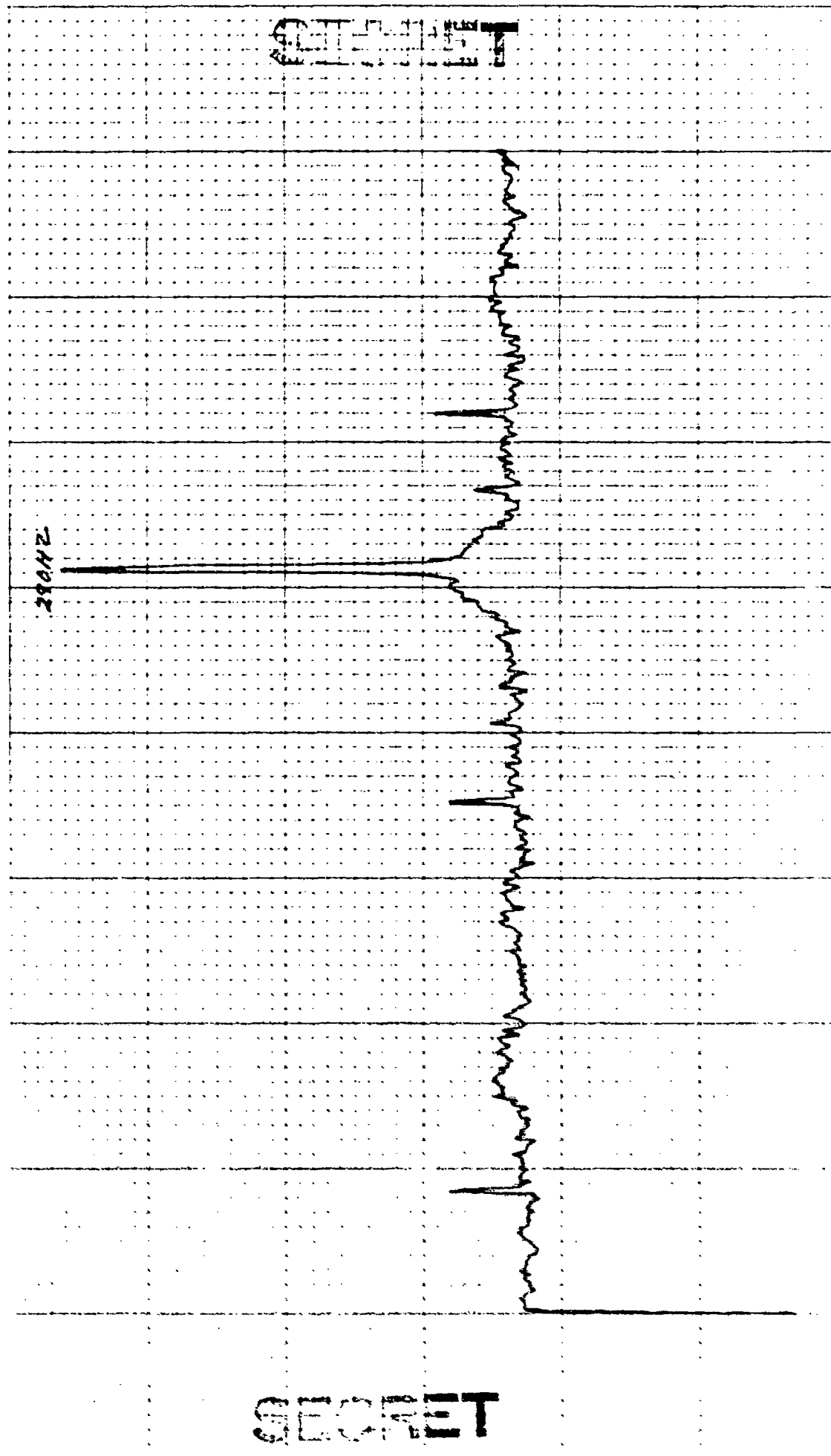
CONTROL: 3-15 - 201 (55)  
OMNI SPECTRUM (ELEMENT 6)  
EXERCISE: BEARING: STAFF  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 201 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

REEL: A10 INDEX 312

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTC: HANNING



SECRET

DATE OF ANALYSIS:

INDEX J620

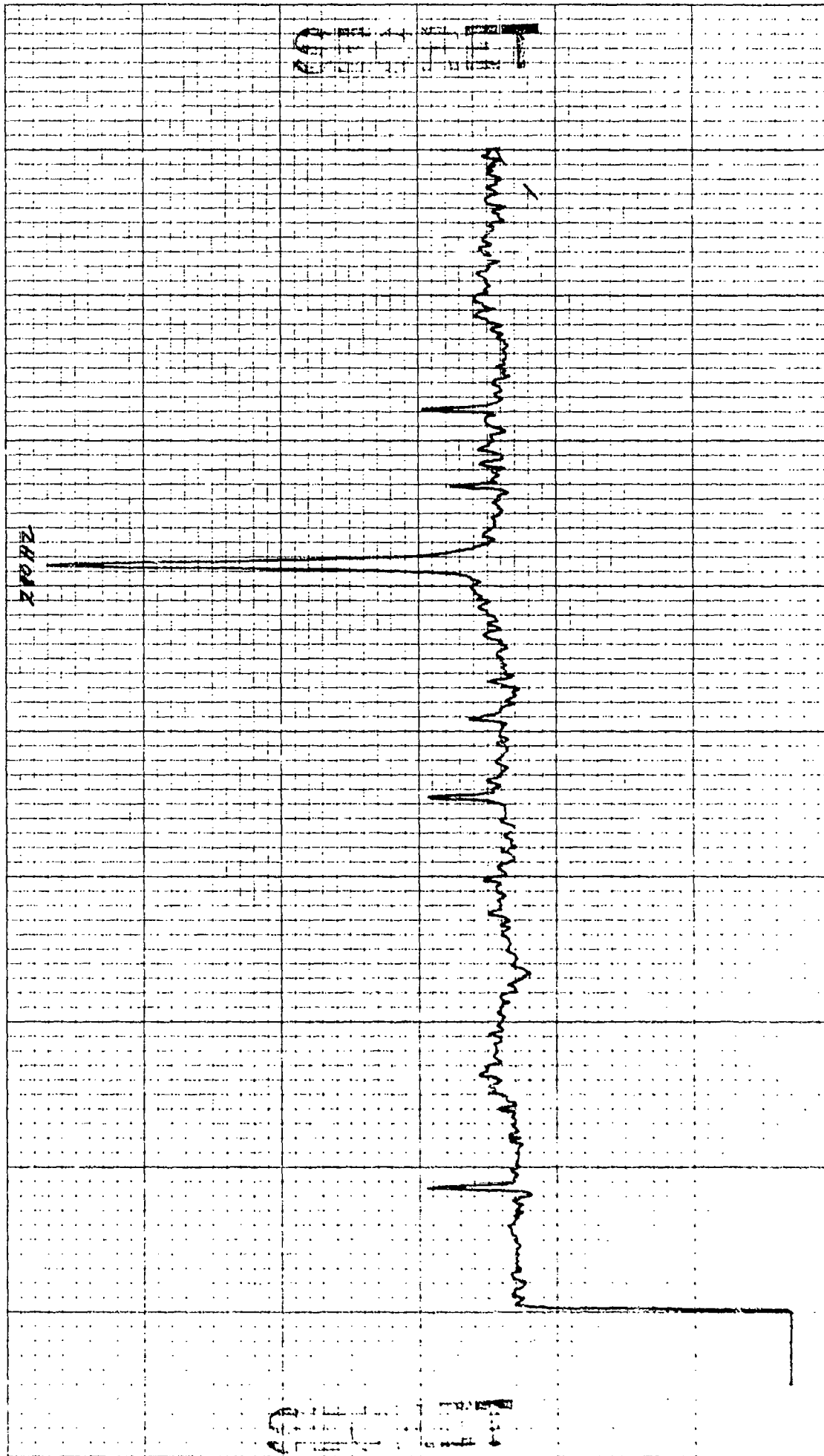
REEL: M10

CONTROL: 3-15-2131 (56)  
OMNI SPECTRUM (ELEMENT 9)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE/TIME: 3-5-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: — DB  
WTG: HANNING



CONTROL: 3-15 - 2/31 (57)  
 OMNI SPECTRUM (ELEMENT 10)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 HZ  
 1 ELEMENT

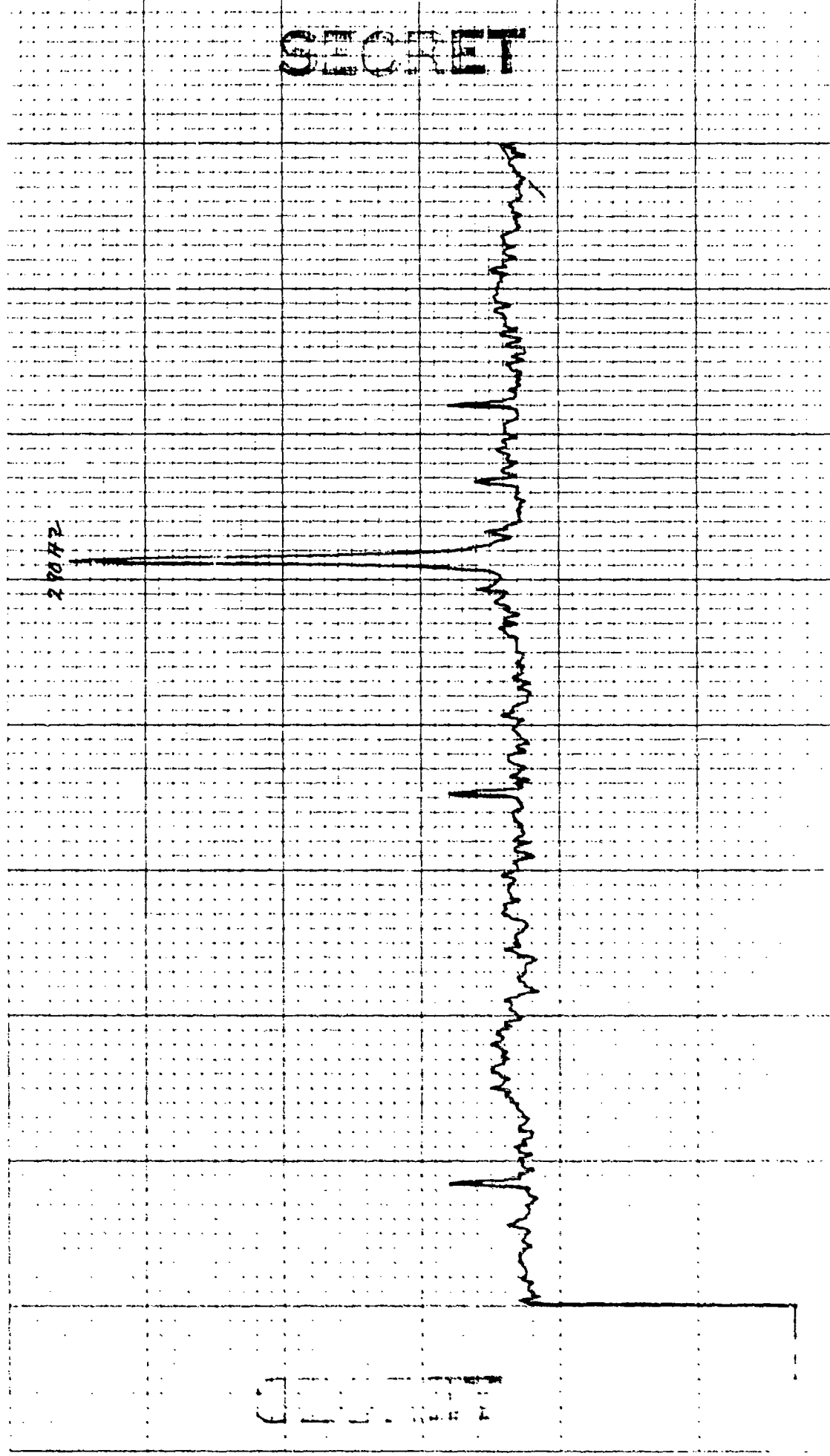
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2/31 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 --- DEG AZ STEERING

REEL: N10

INDEX 3620

INTEGRATION TIME 320 SECS  
 FILTER  
 ATTN: DB  
 WTC: HANNING



46 0703

1000 0000 0000 0000

CONTROL: 3-15-2131 (58)  
OMNI SPECTRUM(ELEMENT 12)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
DEG AZ STEERING

REEL: N10

INDEX 3690

INTEGRATION TIME 320 SECS  
ATTN: - DB  
FILTER WTG: HANNING

200 Hz

SECRET

SECRET

46 0703

CONTROL: 3-15-2131 (59)  
OMNI SPECTRUM/ELEMENT 14  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

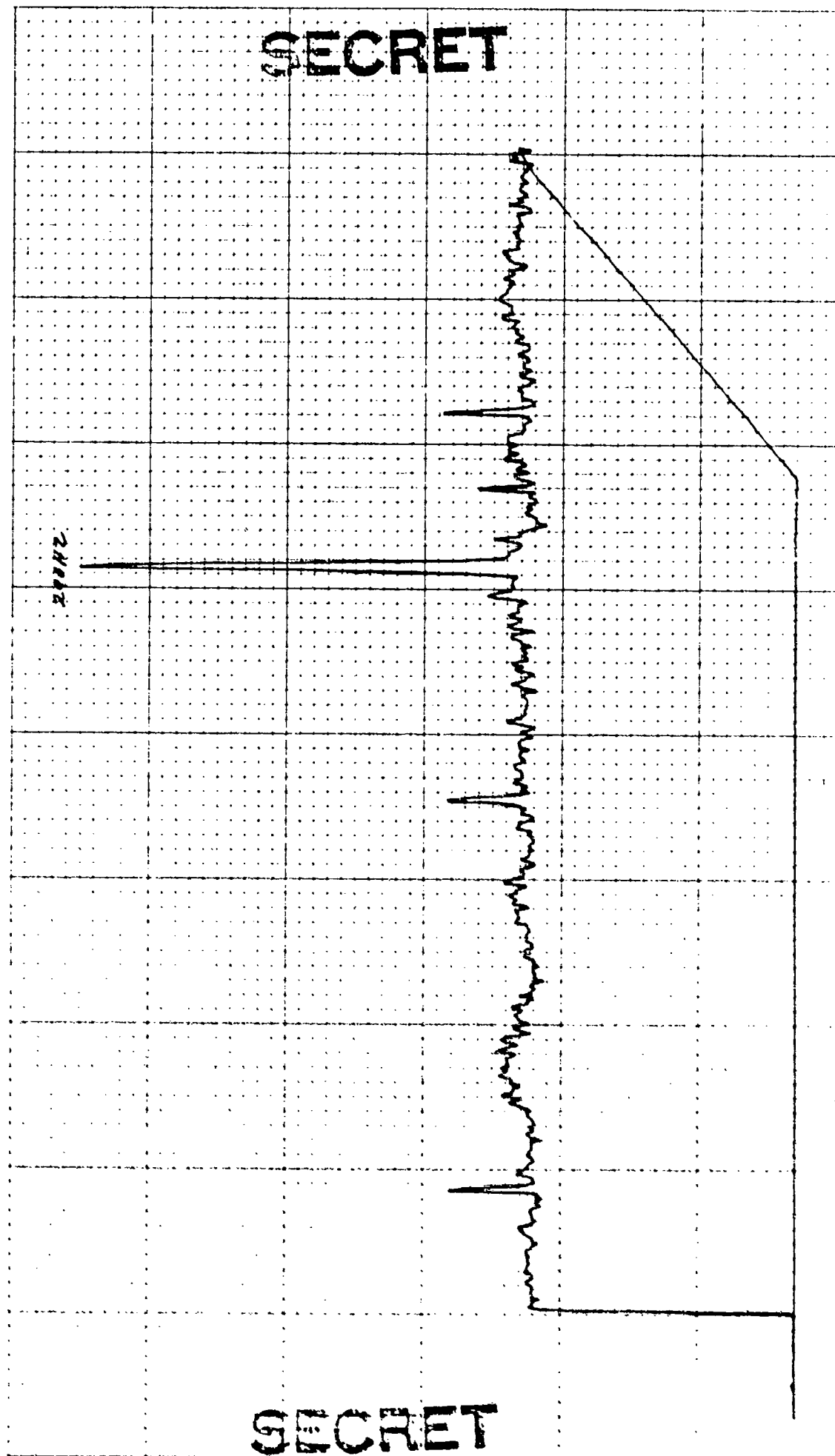
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10HZ  
— DEG AZ STEERING

REEL: H10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: - DB  
FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF: 3-15-77-2131 (60)

CONTROL: 3-15-77-2131 (60)  
OMNI SPECTRUM (ELEMENT 16)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE OF ANALYSIS:

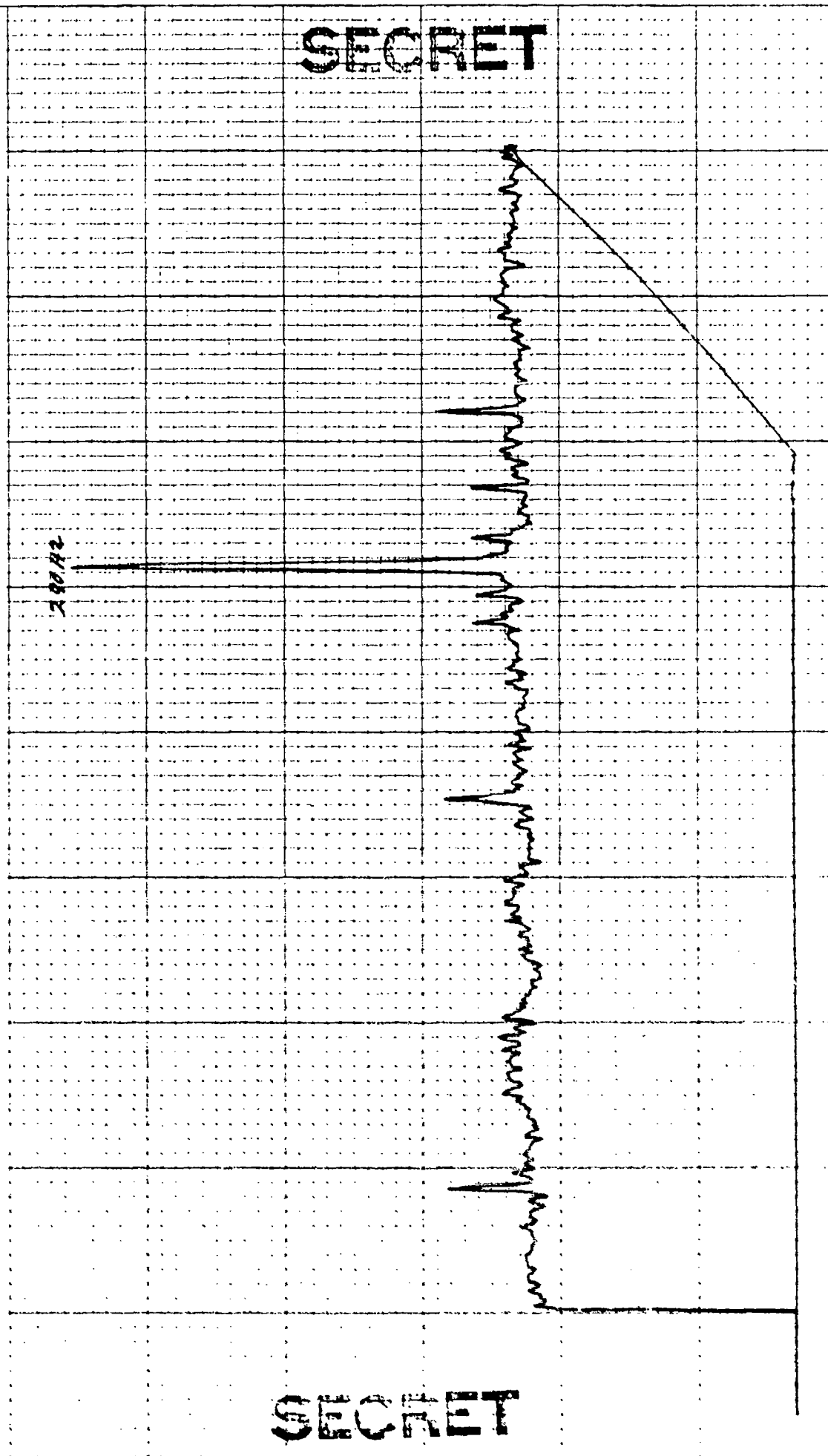
DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ  
DEC AZ STEERING

REEL: 110

INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING  
ATTEN: - DB



10Z 200000Z 090600Z 090600Z

46 0703

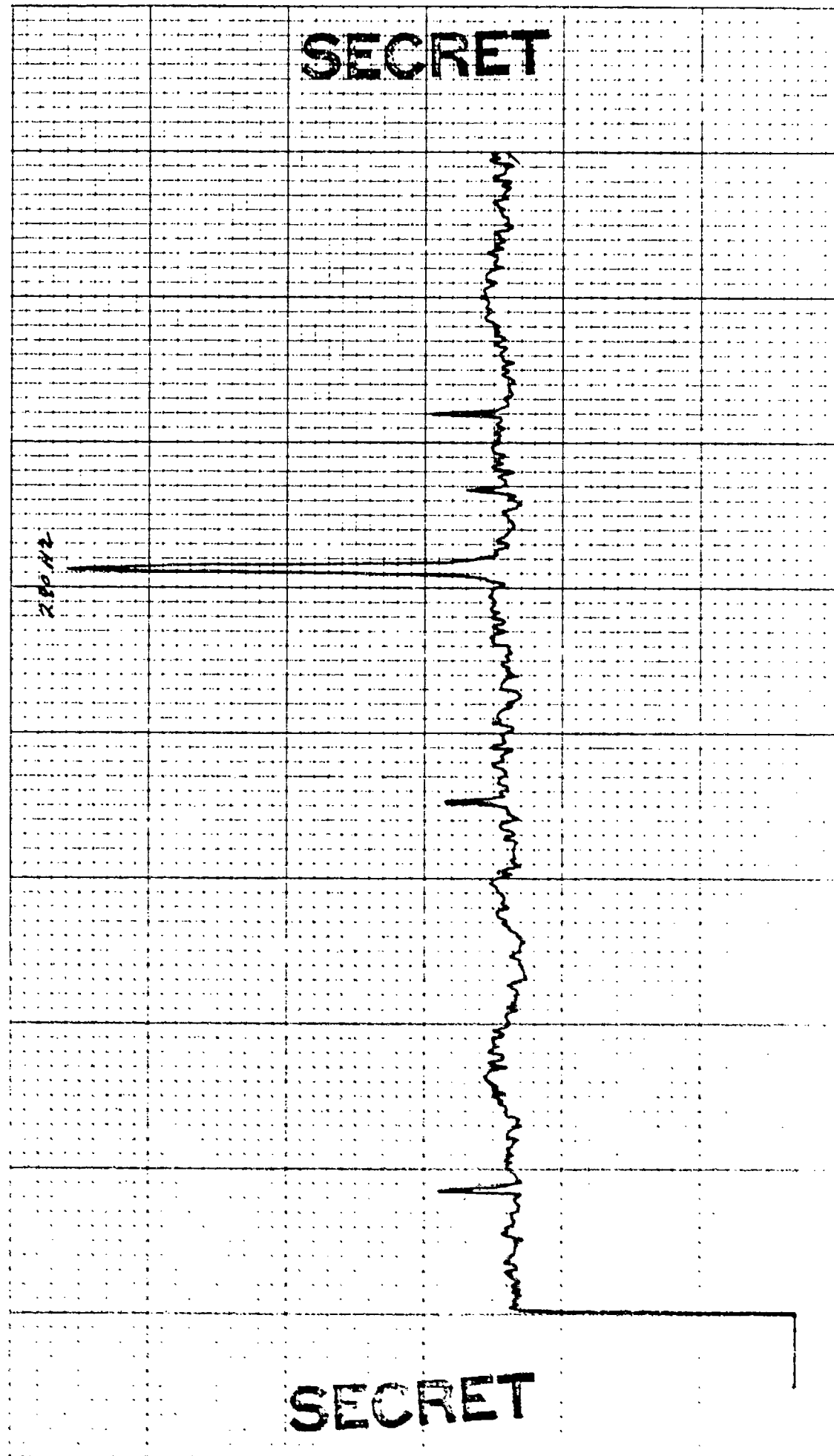
CONTROL: 3-45-2031 (41)  
OMNI SPECTRUM (ELEMENT 19)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-5-77 - 2031 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: M10 INDEX 3620

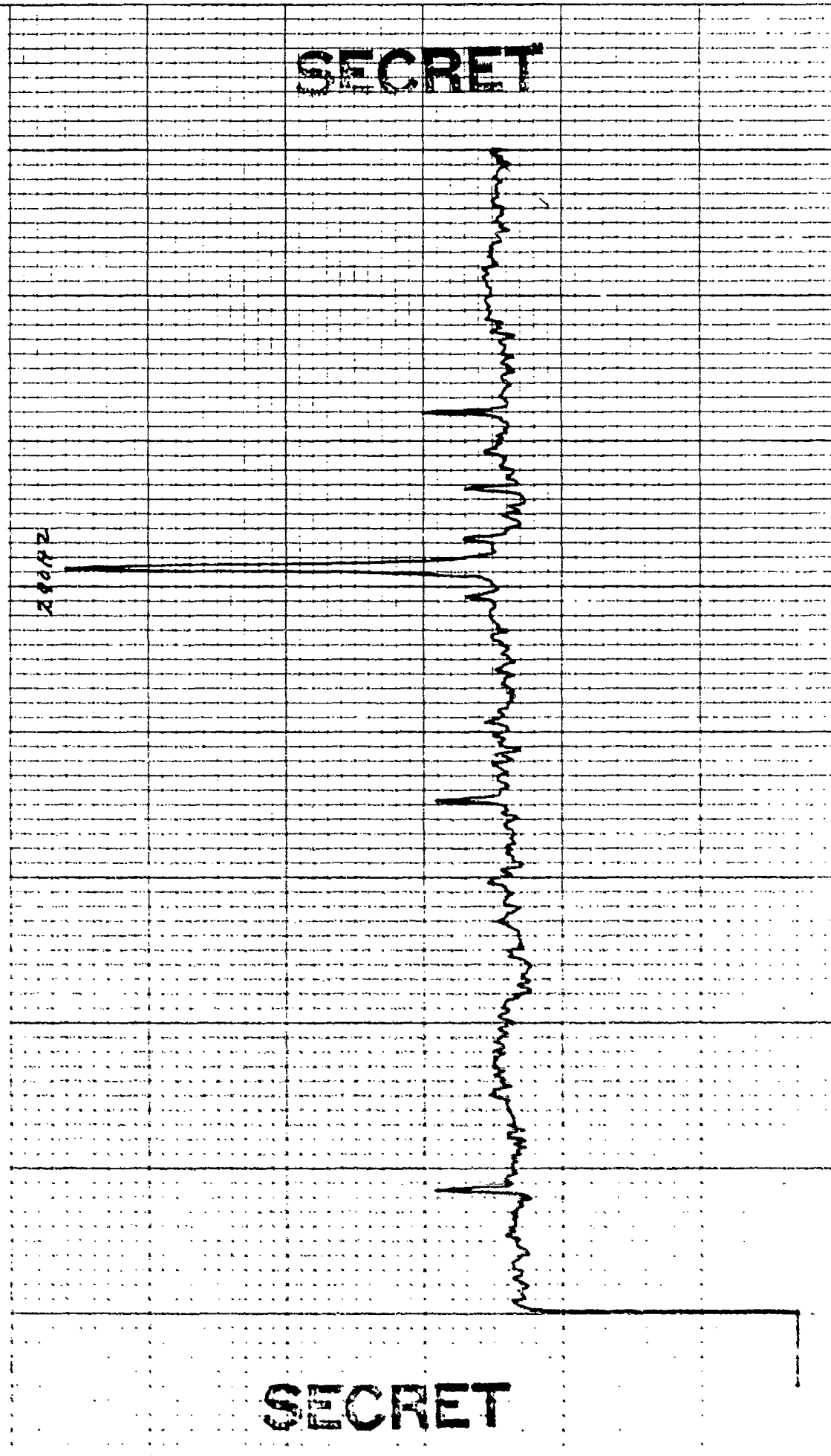
INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING  
ATTEN: — DB





1. The first step is to identify the problem or question that needs to be addressed. This involves understanding the context and the specific requirements of the task.

CONTROL: 3-15-2171 (62)      DATE OF ANALYSIS:      REEL: N10      INDEX 3622C  
OMNI SPECTRUM (ELEMENT 30)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ      DATE/TIME: 3-15-77-2131 Z      INTEGRATION TIME 320 SECS      ATTN: — DB  
1 ELEMENT      ———— DEG AZ STEERING      FILTER      WTC: HANNING



**SECRET**

46 0703

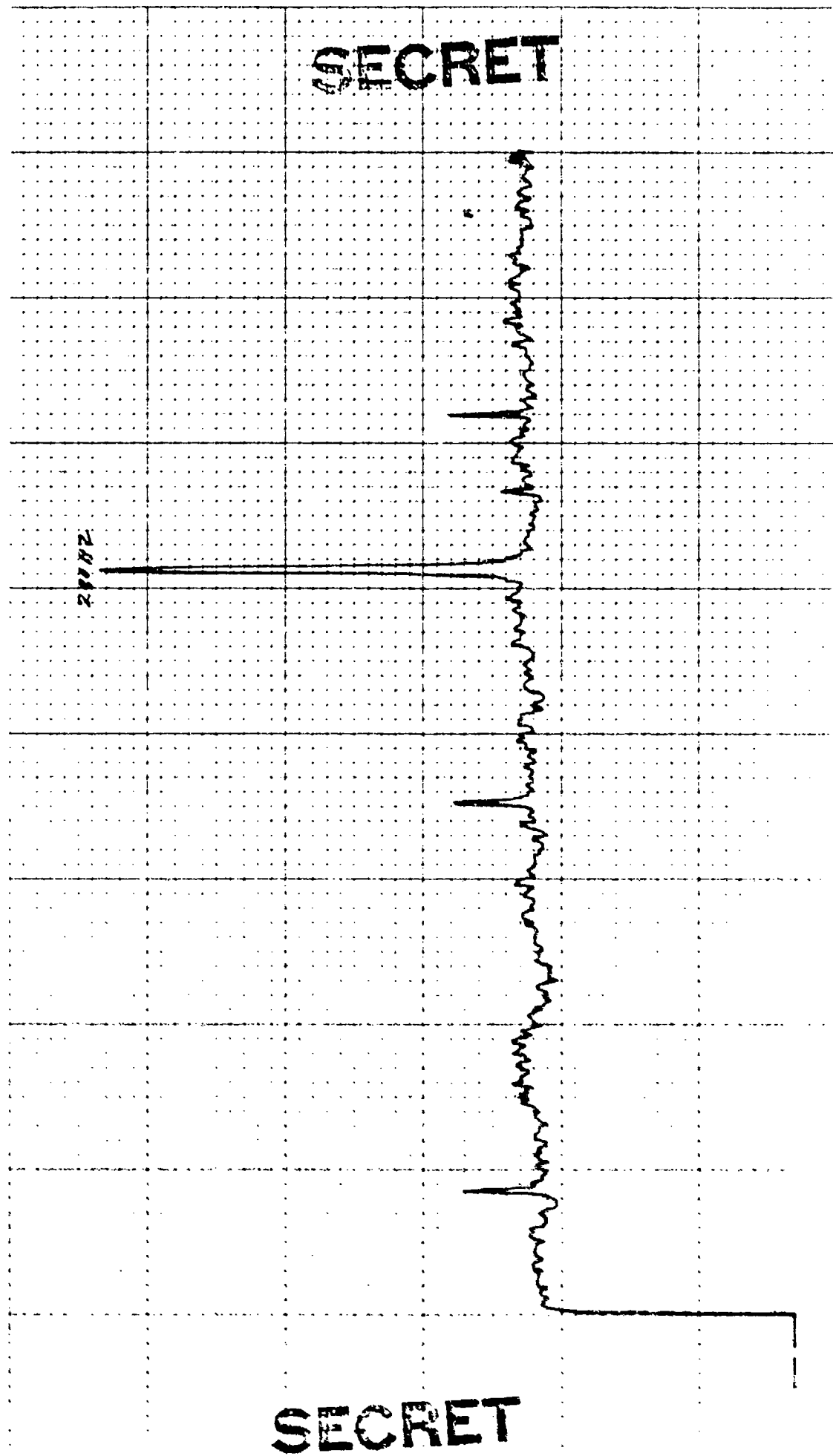
CONTROL: 3-15 - 2071 (63)  
OMNI SPECTRUM (ELEMENT 23)  
EXERCISE: BEARING STAFF  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2031 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: H10 INDEX 3620

INTEGRATION TIME 320 SECS  
ATTN: — DB  
FILIER WTG: HANNING





46 0703

REF 5000 0000 0000 0000

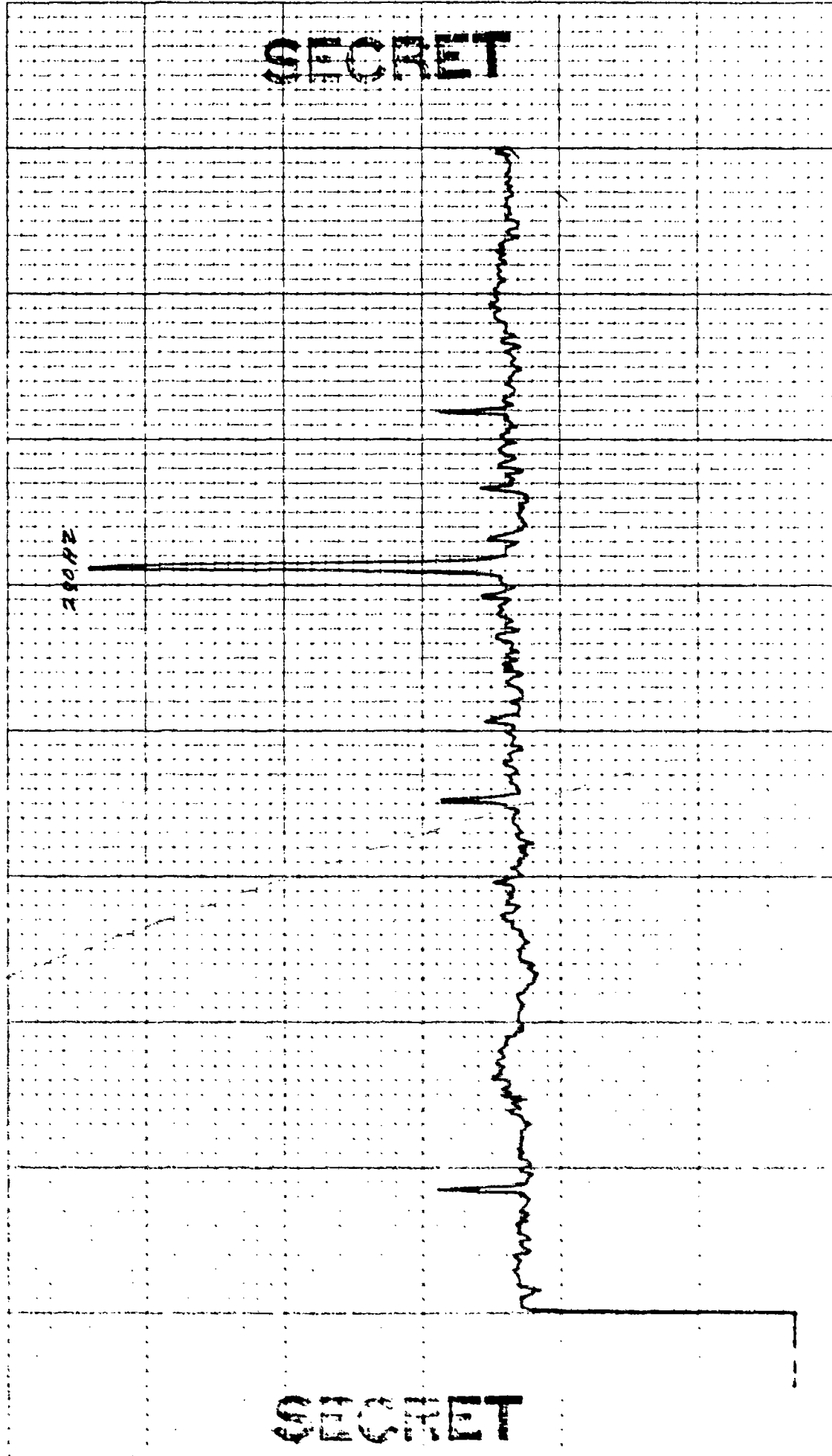
CONTROL: 3-15 - 2171 (65)  
OMNI SPECTRUM (ELEMENT 26)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
-- DEC AZ STEERING

REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS  
ATTEN: DB  
FILTER WTC: HANNING



46 0703

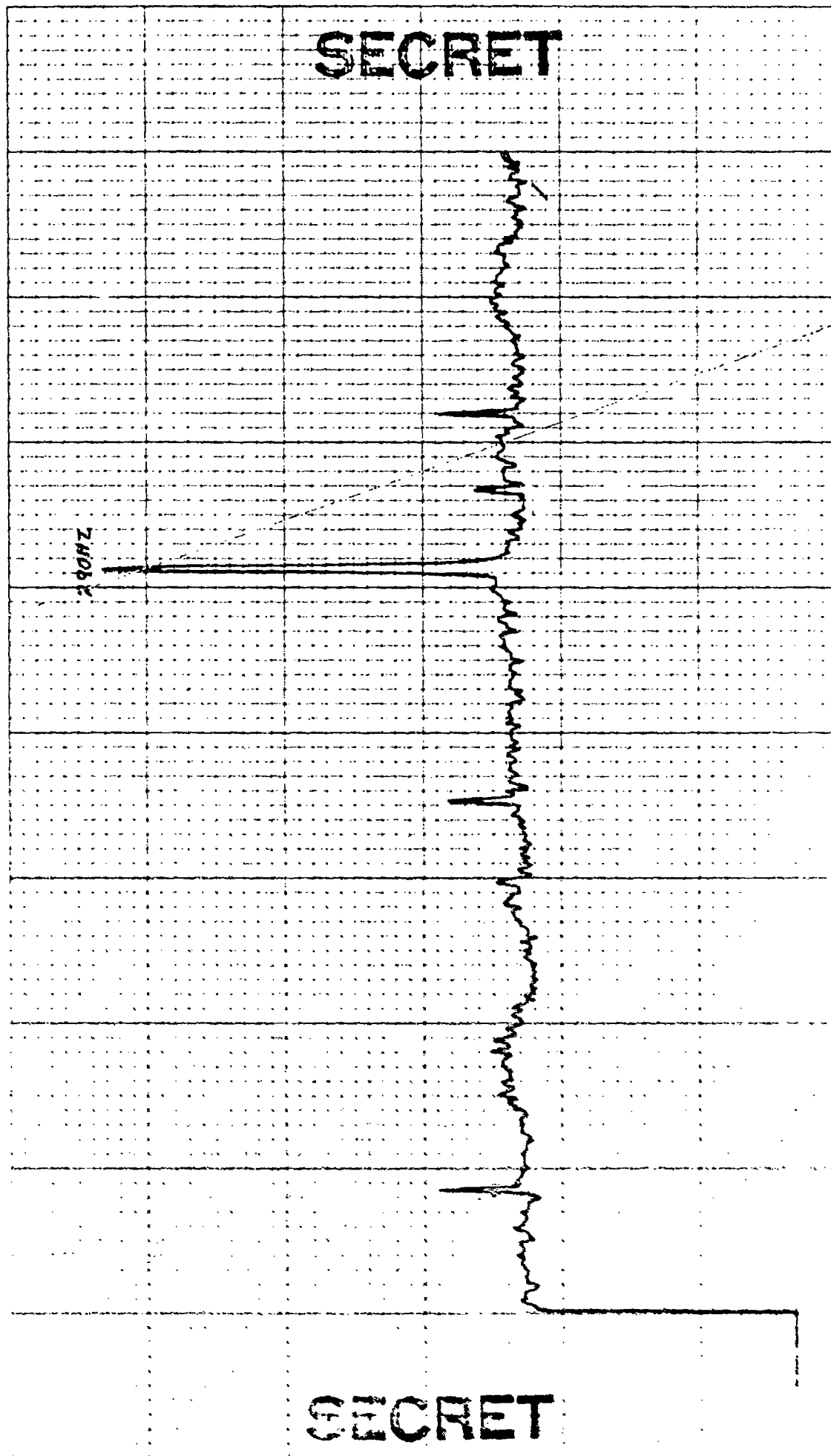
CONTROL: 2031 - 51 (DP3)  
OMNI SPECTRUM (ELEMENT 29)  
EXERCISE: BEARING: STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 2031 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
- DEC AZ STEERING

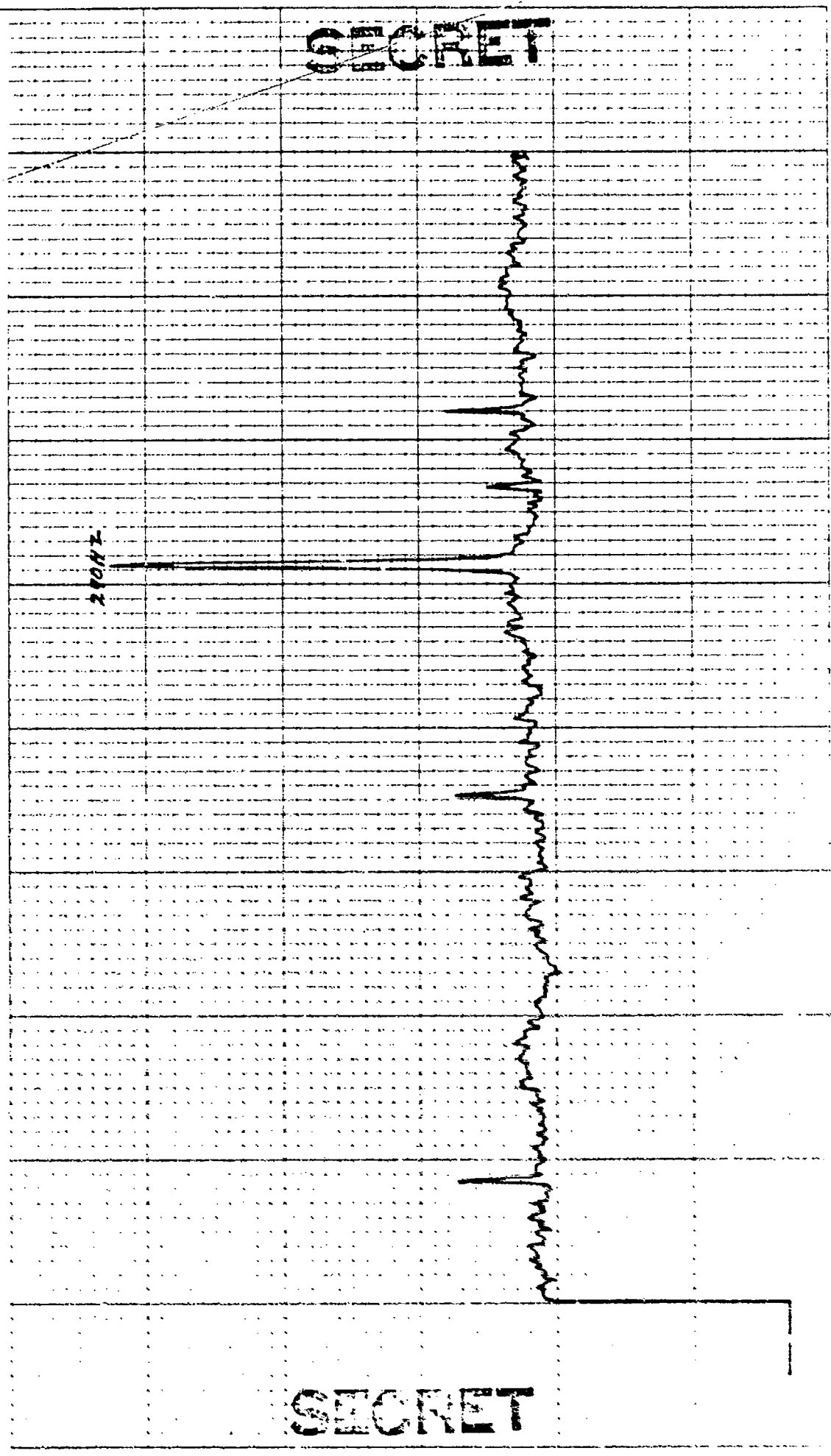
REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: - DB  
WTC: HANNING



46 0703

CONTROL: 3-15 - 2131 (67) INDEX 3620  
OMNI SPECTRUM (ELEMENT 31) REEL: M10  
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB  
CENTER FREQ: 280 HZ FILTER WTC: HANNING  
DATE OF ANALYSIS: ANALYSIS BANDWIDTH: 1/10 HZ  
DEC AZ STEERING



SECRET

SECRET

46 0703

CONTROL: 3-15 - 2131 (68)  
OMNI SPECTRUM (ELEMENT 33)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z

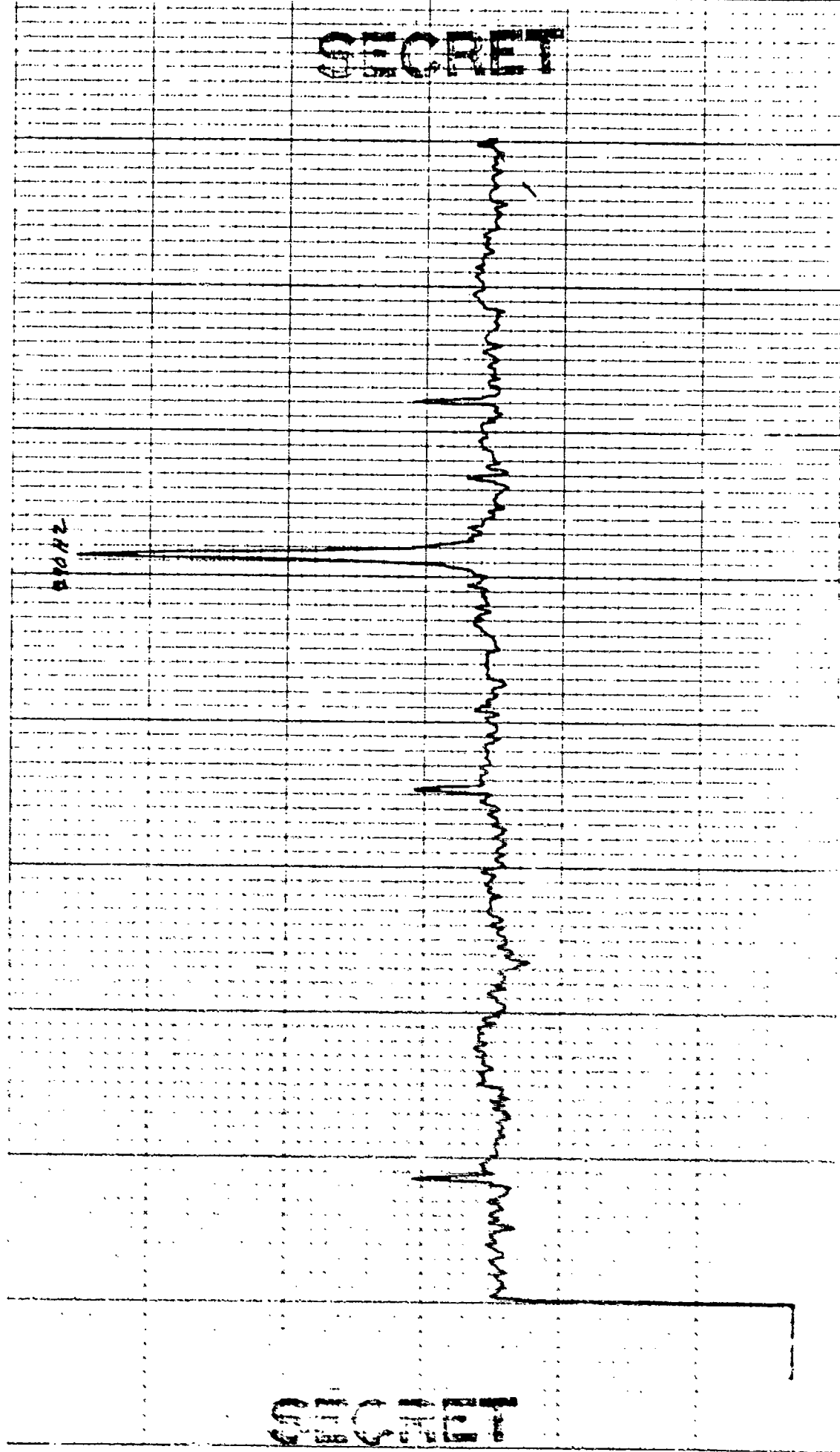
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: M10

INDEX 3626

INTEGRATION TIME 320 SECS  
FILTER

ATTN: — DB  
WTC: HANNING



SECRET

SECRET

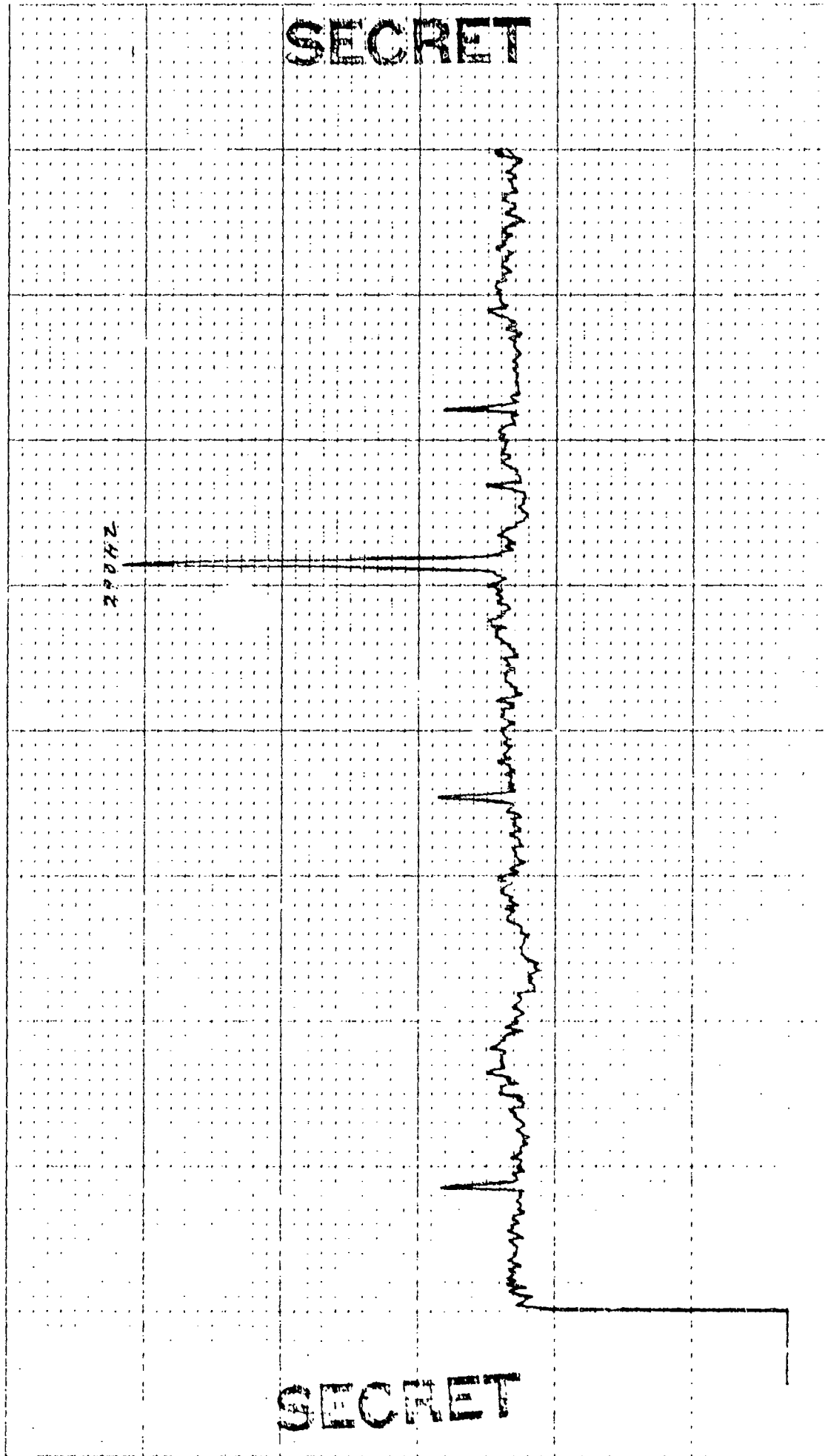




REF ID: A66500

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CONTROL: 3-45-2131 (70)      DATE OF ANALYSIS:      REEL: M10      INDEX 3620  
OMNI SPECTRUM (ELEMENT 37)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ      DATE/TIME: 3-1577 - 2131Z  
ANALYSIS BANDWIDTH: 1/10 HZ      INTEGRATION TIME 320 SECS      ATTN: DB  
1 ELEMENT      DEG AZ STEERING      FILTER      WTG: HANNING



46 0703

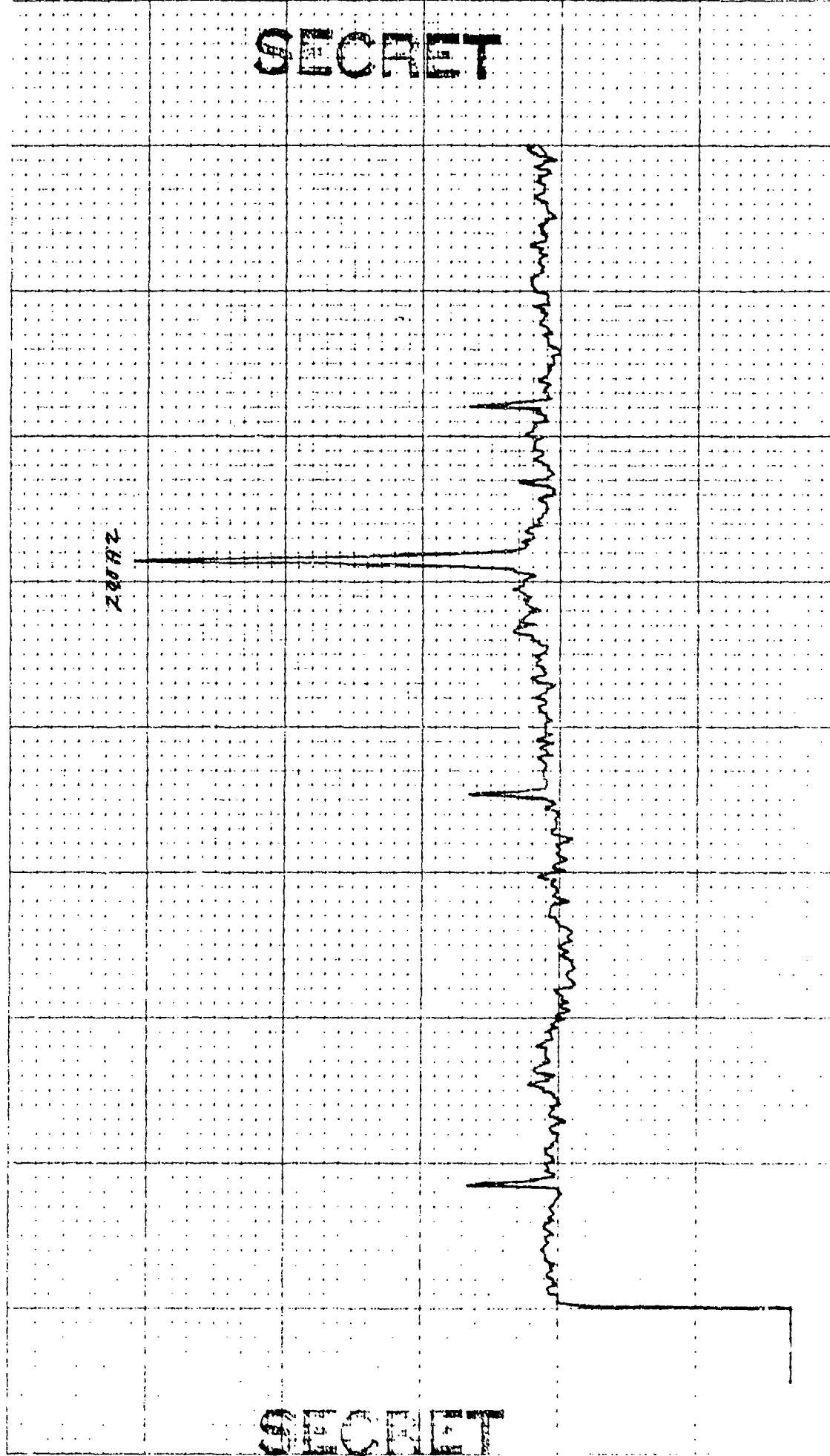
CONTROL: 3-15-2/31 (71)  
OMNI SPECTRUM(ELEMENT 39)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 -2/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: M10 INDEX 3120

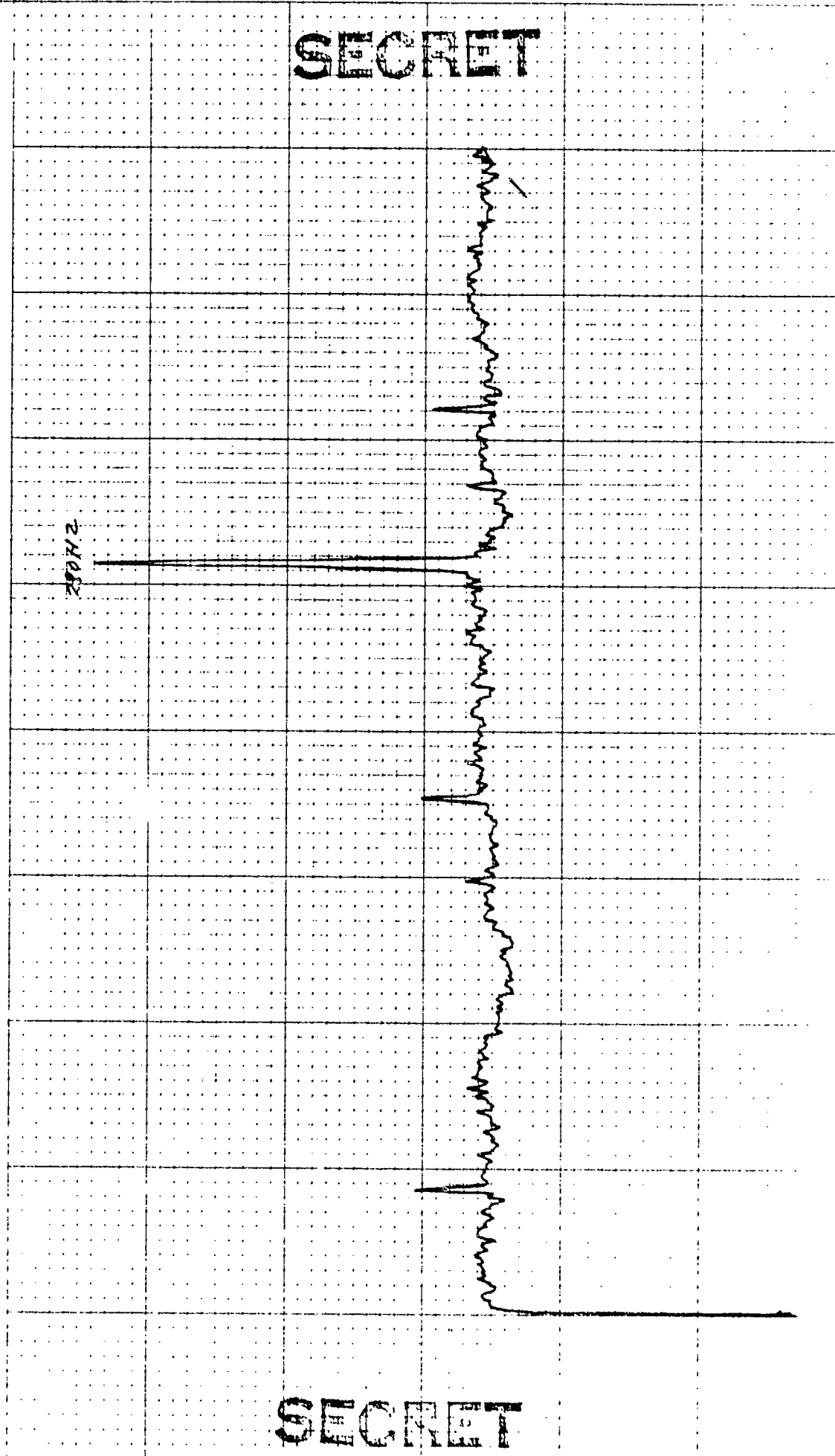
INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTC: HANNING



46 0703

Page 1 of 1

CONTROL: 3-15-2131 (72) DATE OF ANALYSIS: REEL: A10 INDEX 3620  
 OMNI SPECTRUM(ELEMENT 41)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTN: - DB  
 1 ELEMENT FILTER WTC: HANNING  
 DATE/TIME: 3-15-77 - 2131 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 — DEG AZ STEERING



46 0703

CONTROL: 3-45-2/31 (73)  
OMNI SPECTRUM (ELEMENT 43)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

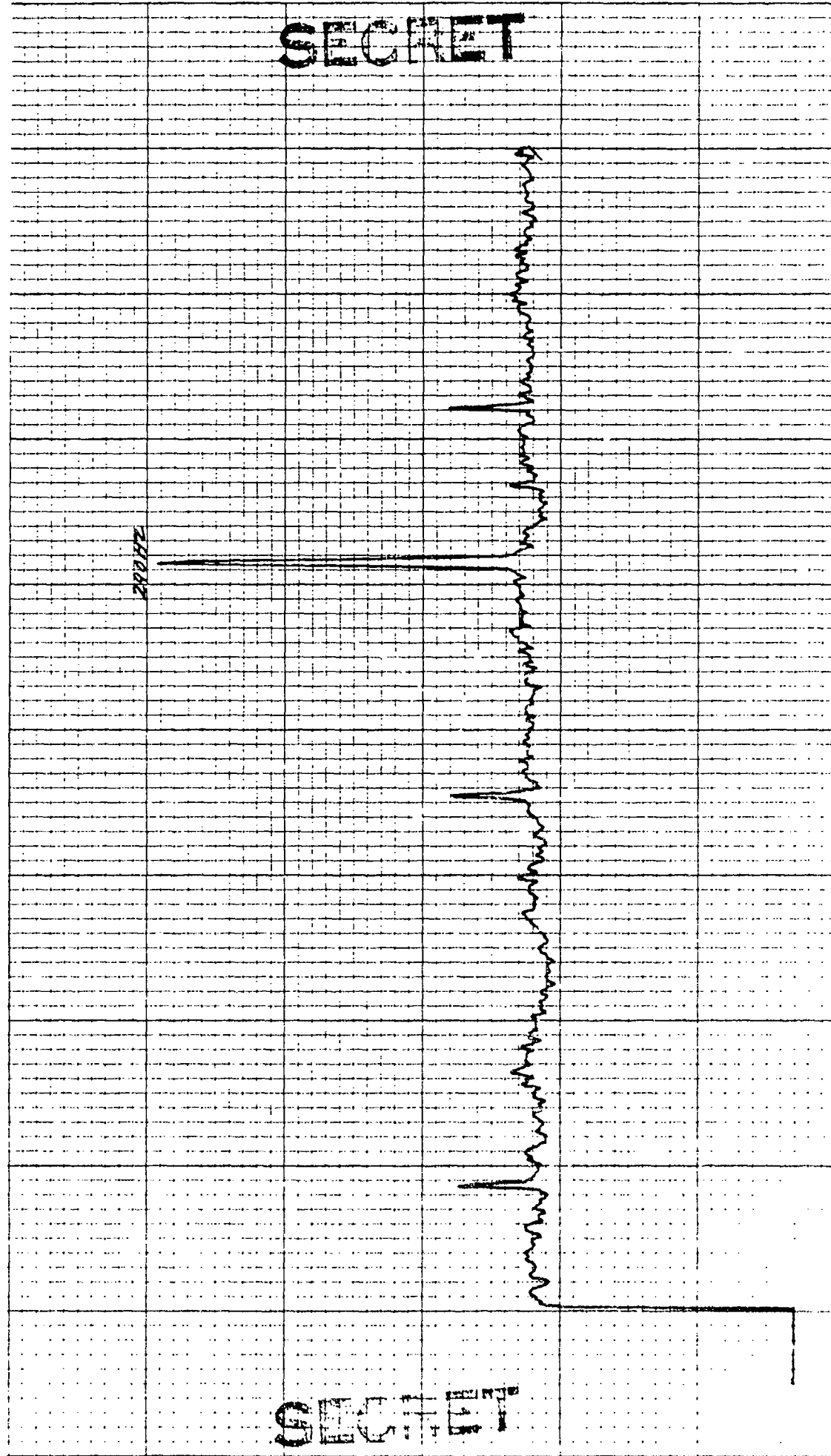
DATE OF ANALYSIS:

DATE/TIME: 3-45-77 - 2/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

REEL: H10

INDEX 3620

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTG: HANNING



46 0703

Page 1 of 1

CONTROL: 3-15-2131 (74)  
OMNI SPECTRUM (ELEMENT 45)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE OF ANALYSIS:

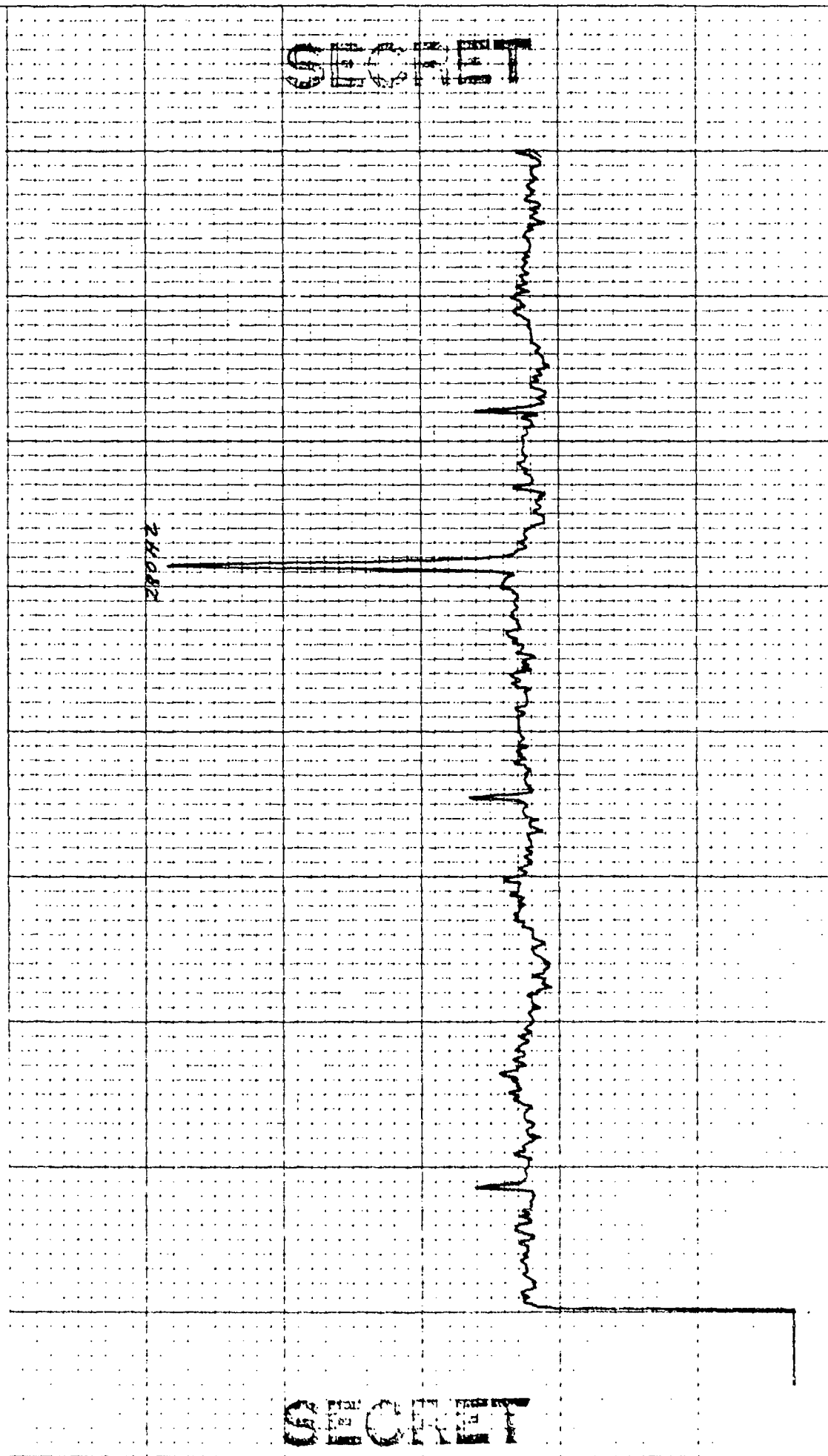
DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

REEL: 410

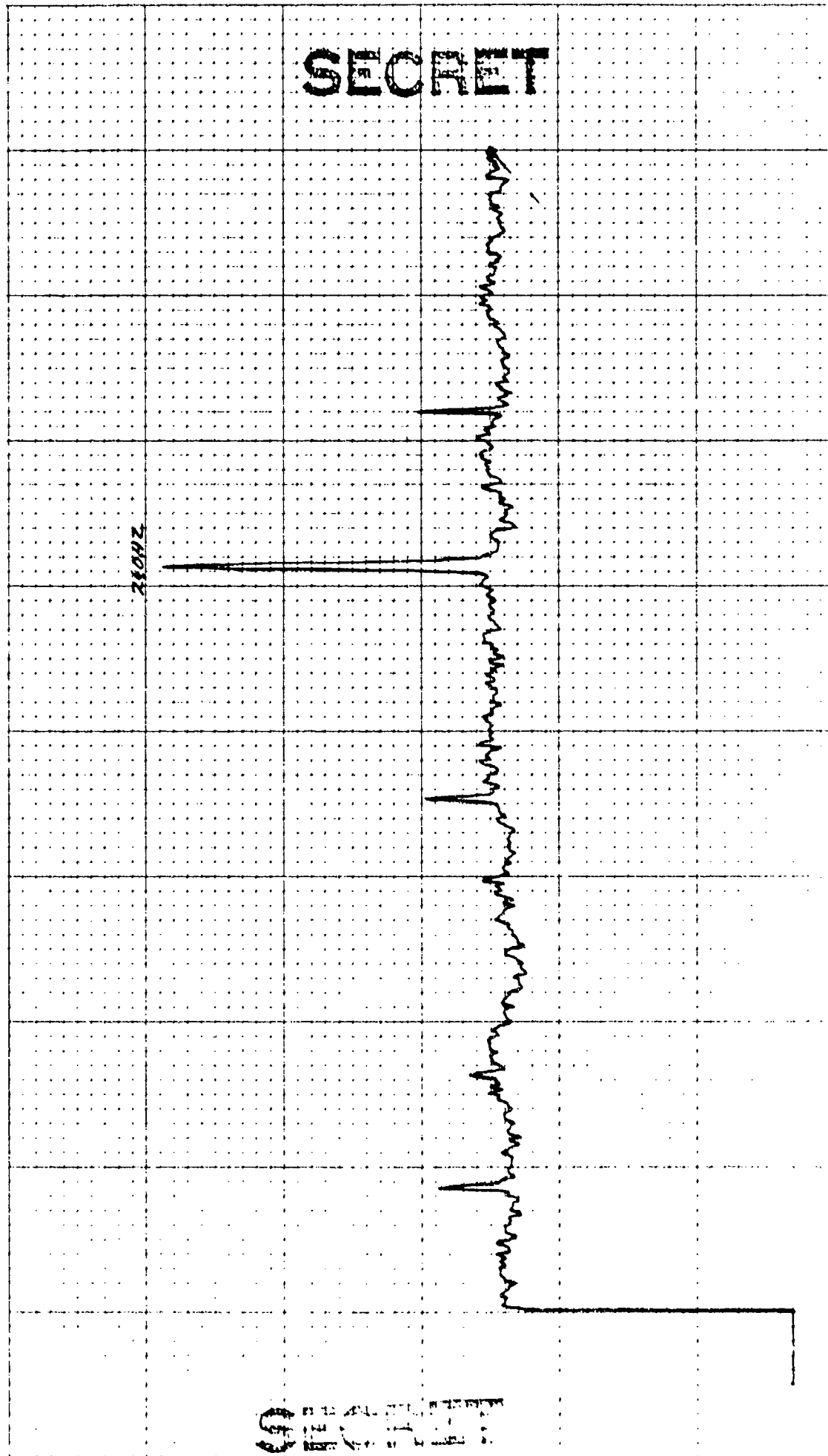
INDEX 3020

INTEGRATION TIME 320 SECS  
FILTER  
ATTN: DB  
WTC: HANNING



46 0703

CONTROL: 3-15-2131 (75) DATE OF ANALYSIS: REEL: M10 INDEX 3620  
OMNI SPECTRUM(ELEMENT 47)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT  
DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: - DB  
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING  
— DEG AZ STEERING



46 0703

100% 10/20/77 10/20/77 10/20/77

INDEX 3020

REEL: M10

DATE OF ANALYSIS:

CONTROL: 3-15 - 2131 (76)  
OMNI SPECTRUM(ELEMENT 49)

EXERCISE: BEARING STAKE

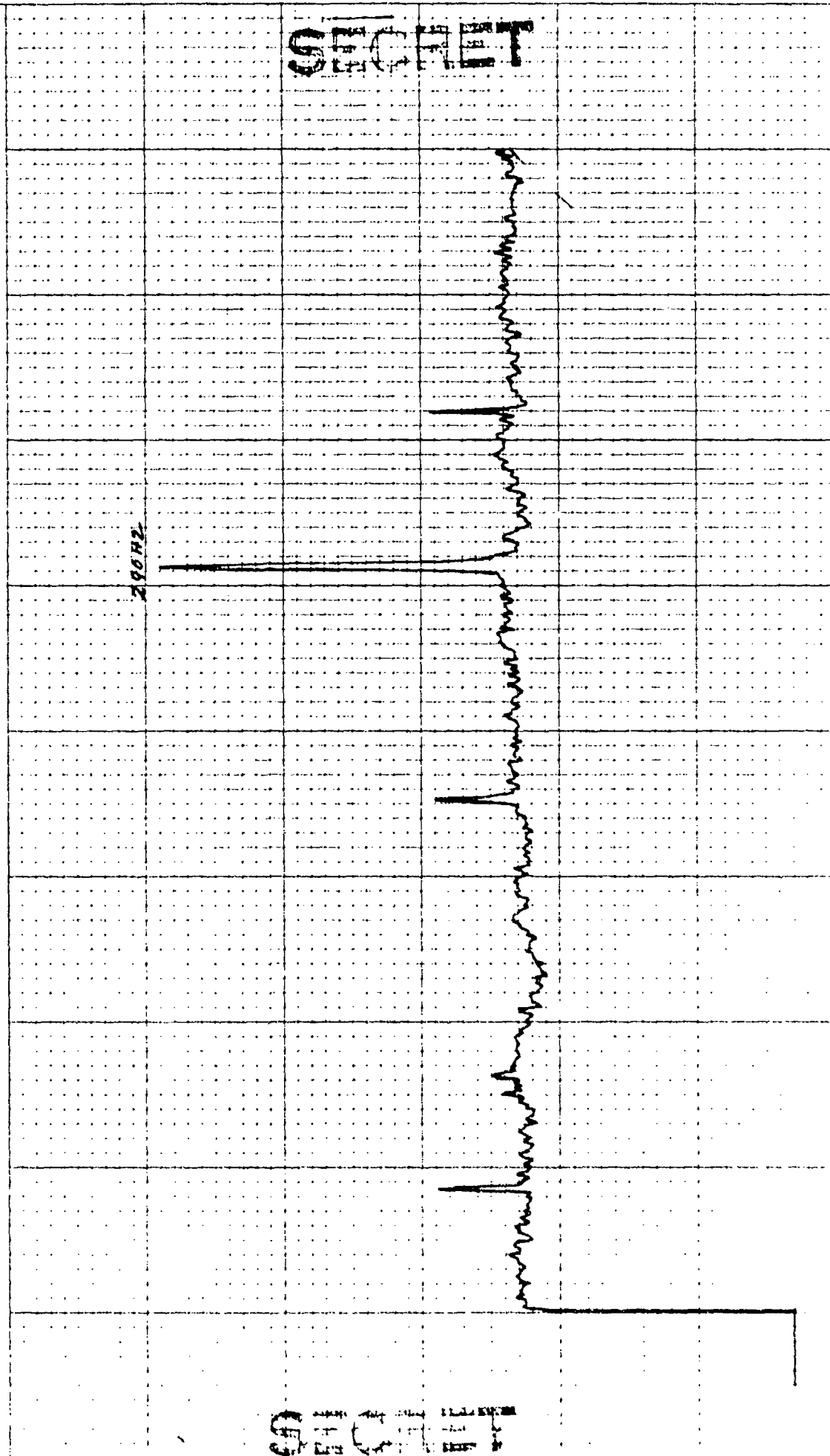
CENTER FREQ: 280 HZ

I ELEMENT

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ

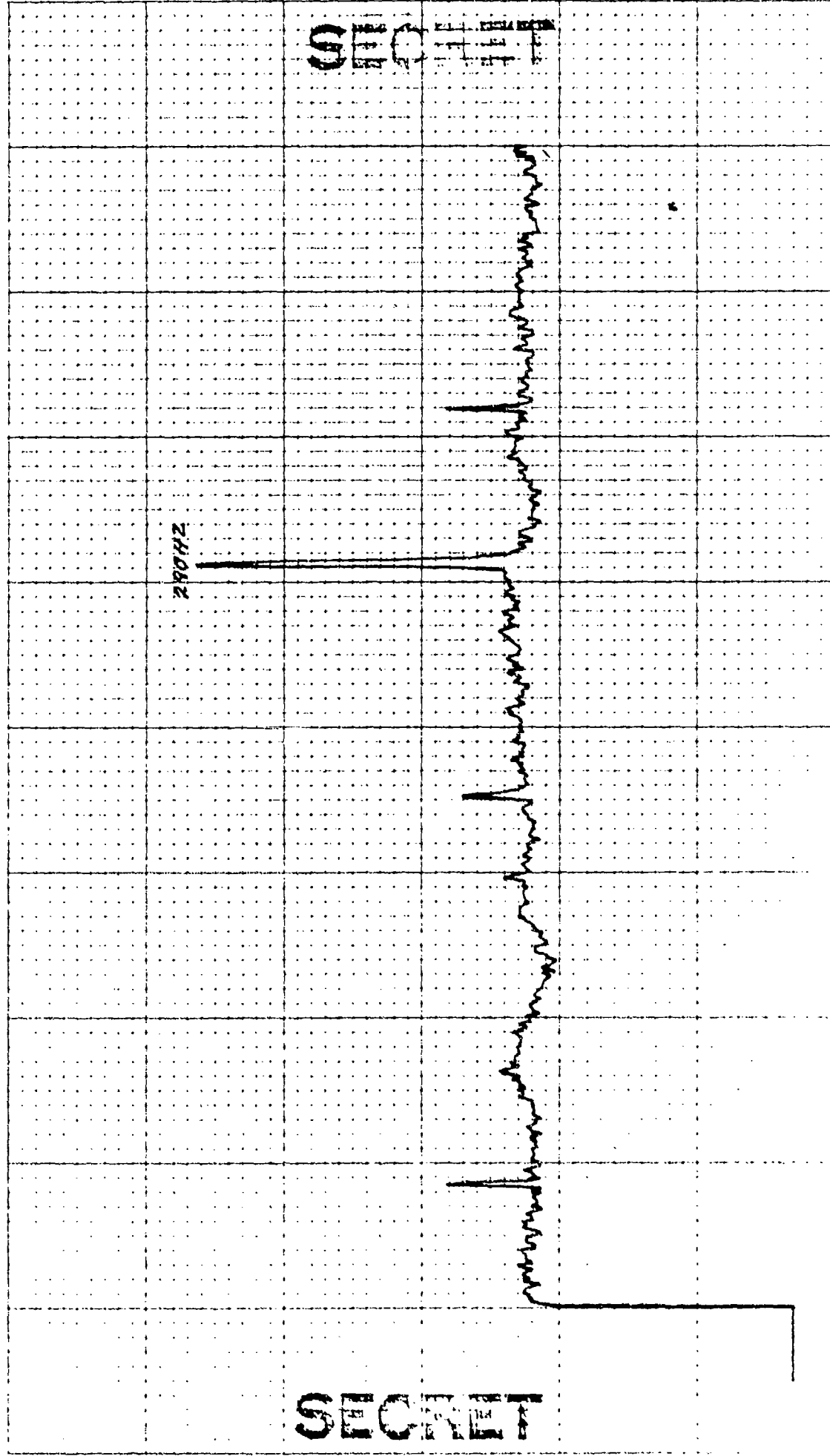
— DEG AZ STEERING

INTEGRATION TIME 320 SECS  
ATTEN: — DB  
FILTER WTG: HANNING



46 0703

CONTROL: 3-15-2131 (77) DATE OF ANALYSIS: REEL: N10 INDEX 362c  
OMNI SPECTRUM (ELEMENT 51)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
INTEGRATION TIME 320 SECS ATTN: - DB  
FILTER WTG: HANNING  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING







25HZ

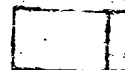
140HZ

50

100

150

150



MRA

CONTROL NUMBER 100  
NUMBER OF ELEMENTS 100  
FREQUENCY BAND 25 TO 140 HZ  
RANGE 50 N.W.

HISTORICAL  
TAPE REEL NUMBER 1

ANALYSIS BAND WIDTH 10  
WATER DEPTH 100

FILE  
DATE  
CARD

140H2

SECRET

290H2 296H2

☐ ☐ MRA

SECRET

REF ID: A7  
PAGE 101 NUMBER 27

EXERCISE NUMBER 101  
DATE 10/1/50

EXERCISE

TABLE COUNT 101  
EXERCISE NUMBER 101  
DATE 10/1/50  
EXERCISE BEARING 101

CONFIDENTIAL

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -22.5

MCPS-32 CAL. CORRECTION +10 -12.5

BEAMFORMER GAIN +12 - .5 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .2 -.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -58.7

MCPS-32 CAL. CORRECTION +10 -48.7

BEAMFORMER GAIN +12 -36.7 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR - .5

SIGNAL LEVEL FOR SNR -36.7 31.2

PROCESSOR CORRECTION -4.0 32.2

MRA CORRECTION + .2 32.4 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION -8.2 24.2 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

|                                |              |                                     |
|--------------------------------|--------------|-------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-13.3</u> |                                     |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -3.3                                |
| BEAMFORMER GAIN                | <u>+12</u>   | +8.7 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .6</u>  | +9.3 SIG. LEVEL FOR SIGNAL GAIN     |

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-65.2</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -55.2                                 |
| BEAMFORMER GAIN                | <u>+12</u>   | -43.2 NOISE LEVEL FOR SNR CALCULATION |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>+8.7</u>  |                       |
| SIGNAL LEVEL FOR SNR | <u>-43.2</u> | 51.9                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | 47.9                  |
| MRA CORRECTION       | <u>+ .6</u>  | 48.5 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-0.2</u>  | 48.3 SNR 1 HZ BAND    |

~~CONFIDENTIAL~~

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

|                                |              |                                   |
|--------------------------------|--------------|-----------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-51.9</u> |                                   |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -41.9                             |
| BEAMFORMER GAIN                | <u>+12</u>   | -29.9 SIG. LEVEL FOR SNR CALCULAT |
| MRA CORRECTION                 | <u>+ .8</u>  | -29.1 SIG. LEVEL FOR SIGNAL GAIN  |

NOISE LEVEL

|                                |              |                                         |
|--------------------------------|--------------|-----------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-64.8</u> |                                         |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -54.8                                   |
| BEAMFORMER GAIN                | <u>+12</u>   | -42.8 NOISE LEVEL FOR SNR CALCULA<br>TI |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>-29.9</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-42.8</u> | 26.9                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | 22.9                  |
| MRA CORRECTION       | <u>+ .8</u>  | 23.7 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-8.2</u>  | 15.5 SNR 1 HZ BAND    |

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# CONFIDENTIAL

DATA    POINT    9

## SIGNAL GAIN

|                        | <u>140 HZ</u> | <u>290HZ</u>  | <u>295HZ</u>  |
|------------------------|---------------|---------------|---------------|
| MEAN OMNI SIGNAL LEVEL | <u>-19.4</u>  | <u>-12.5</u>  | <u>      </u> |
| MRA SIGNAL LEVEL       | <u>- .34</u>  | <u>+ 9.3</u>  | <u>-29.1</u>  |
| ARRAY SIGNAL GAIN      | <u>19.0</u>   | <u>21.8</u>   | <u>      </u> |
| 20 LOG <u>16</u>       | <u>24.0</u>   | <u>24.0</u>   | <u>24.8</u>   |
| # of elements          | <u>      </u> | <u>      </u> | <u>      </u> |
| DIFFERENCE             | <u>- 5.0</u>  | <u>-2.2</u>   | <u>      </u> |

## ARRAY GAIN

|                         |               |               |               |
|-------------------------|---------------|---------------|---------------|
| MRA SNR                 | <u>32.4</u>   | <u>48.5</u>   | <u>9.7</u>    |
| MEAN OMNI SNR           | <u>28.6</u>   | <u>34.5</u>   | <u>N.D.</u>   |
| ARRAY GAIN              | <u>3.8</u>    | <u>14.0</u>   | <u>      </u> |
| THEORETICAL AZMUTH GAIN | <u>8.5</u>    | <u>11.1</u>   | <u>11.0</u>   |
| (at MRA)                | <u>      </u> | <u>      </u> | <u>      </u> |
| DIFFERENCE              | <u>-4.7</u>   | <u>+ 2.9</u>  | <u>      </u> |

# CONFIDENTIAL

H.E. DATA TO THE DEPARTMENT OF THE ARMY  
RECEIVED 10-15-77

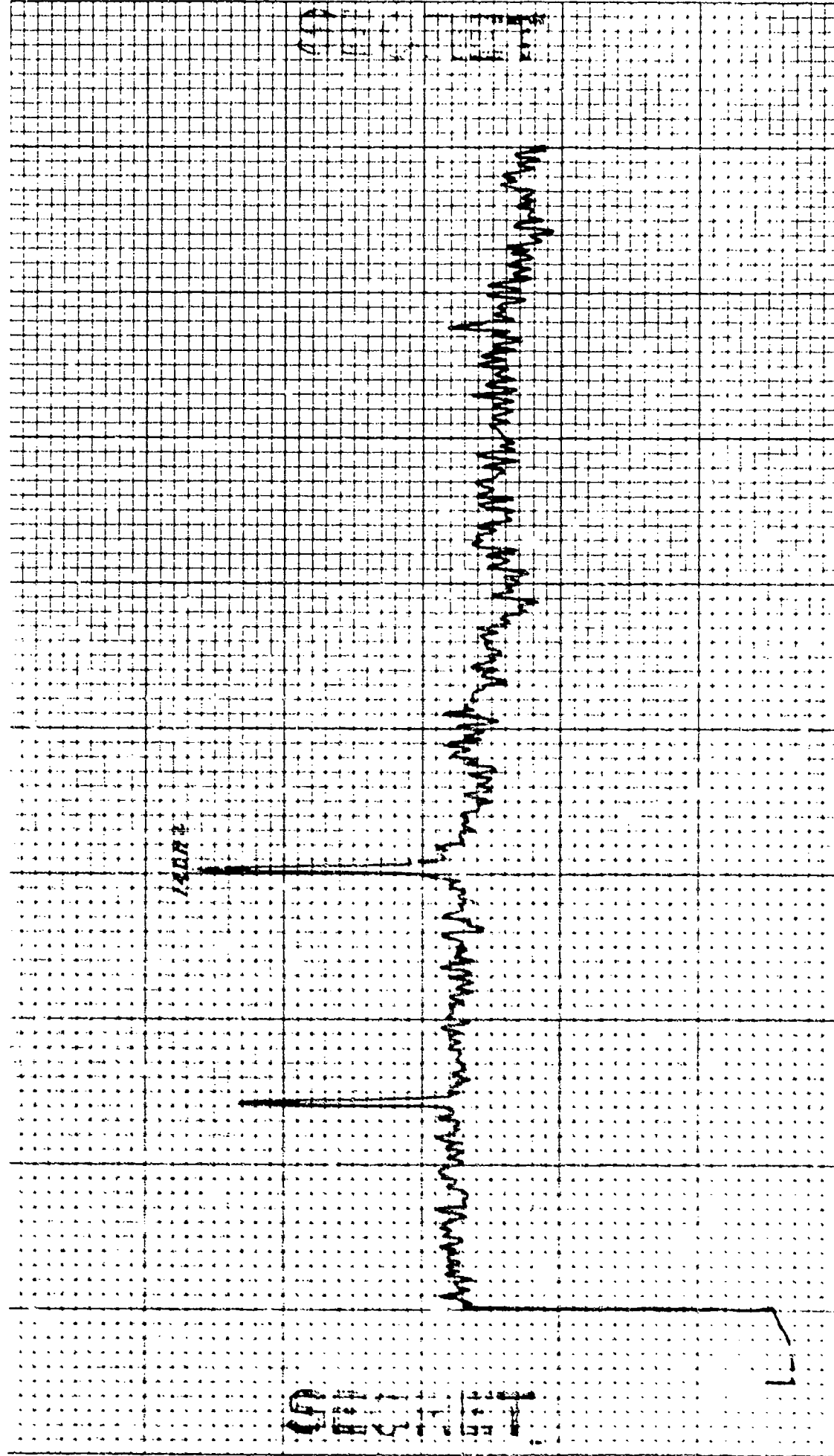
46 0703

CONTROL: 2171 - 16 (DP1)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-10  
DATE/TIME: 1-15-77 - 2:13 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 36 DEG. AZ STEERING

REEL: 410 INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER  
WTG: HANNING





46 0703

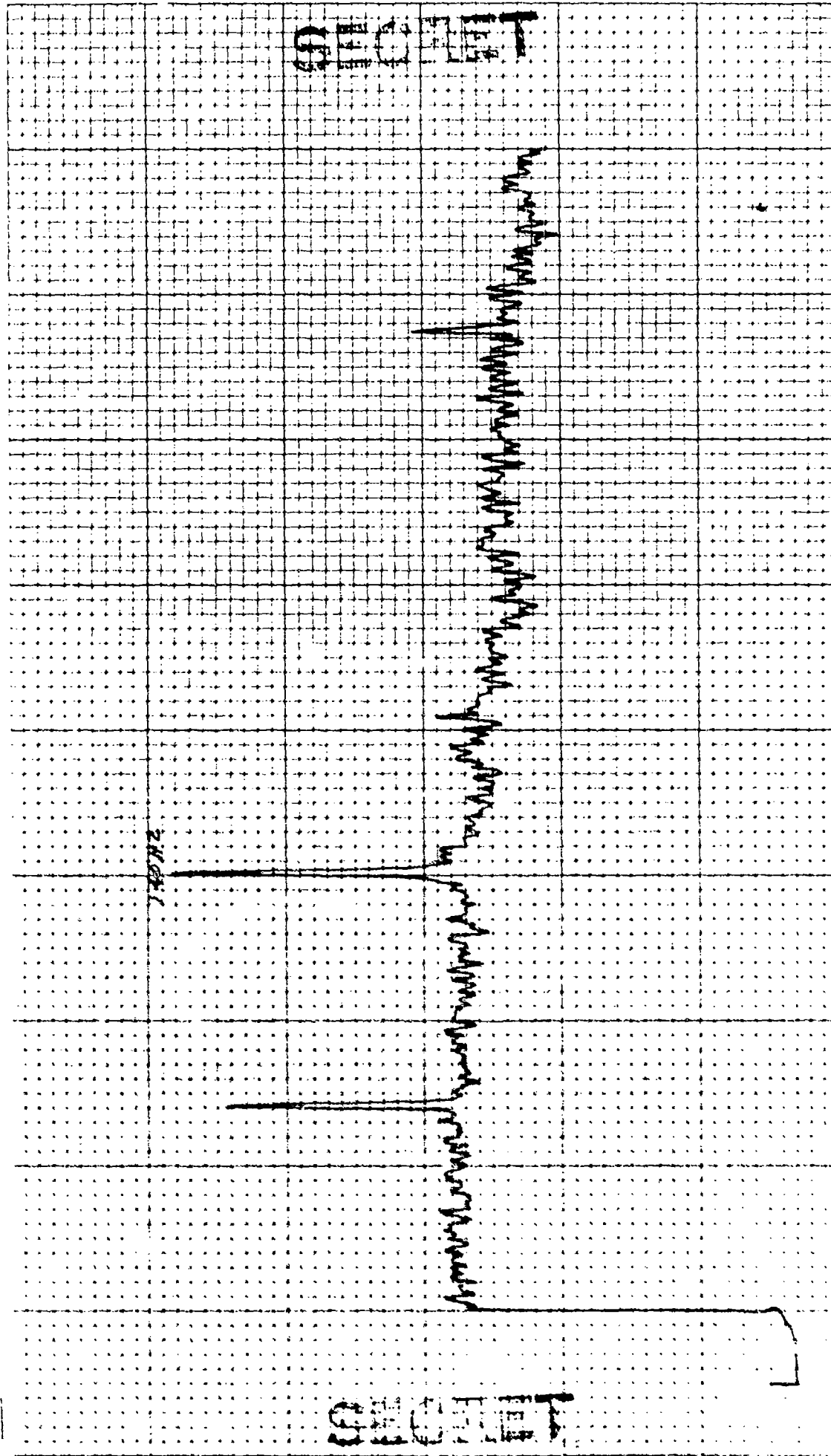
INDE X3620

REEL: 410

INTEGRATION TIME 320 SECS      ATTN:-12 DB  
                                FILTER         WTC: HANNING

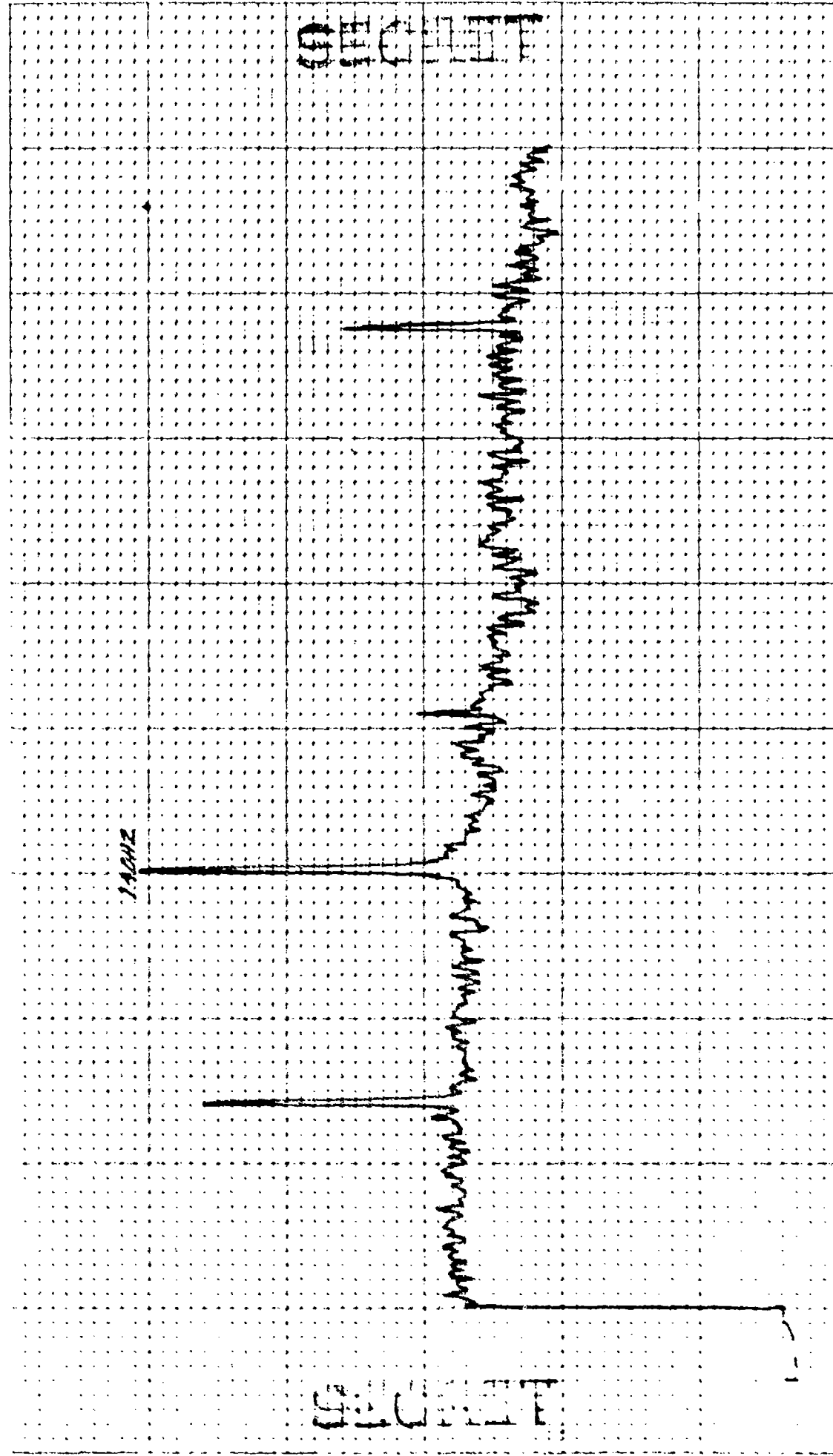
ATTN: -12 DB  
WTC: HANNING

DATE OF ANALYSIS: 1-16 )  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 30 DEG. AZ STEERING



46 0703

FILE # 3620



KOE 10.5 TO THE INCHES  
HELIX & CROSS CO. 10.5 TO THE INCHES

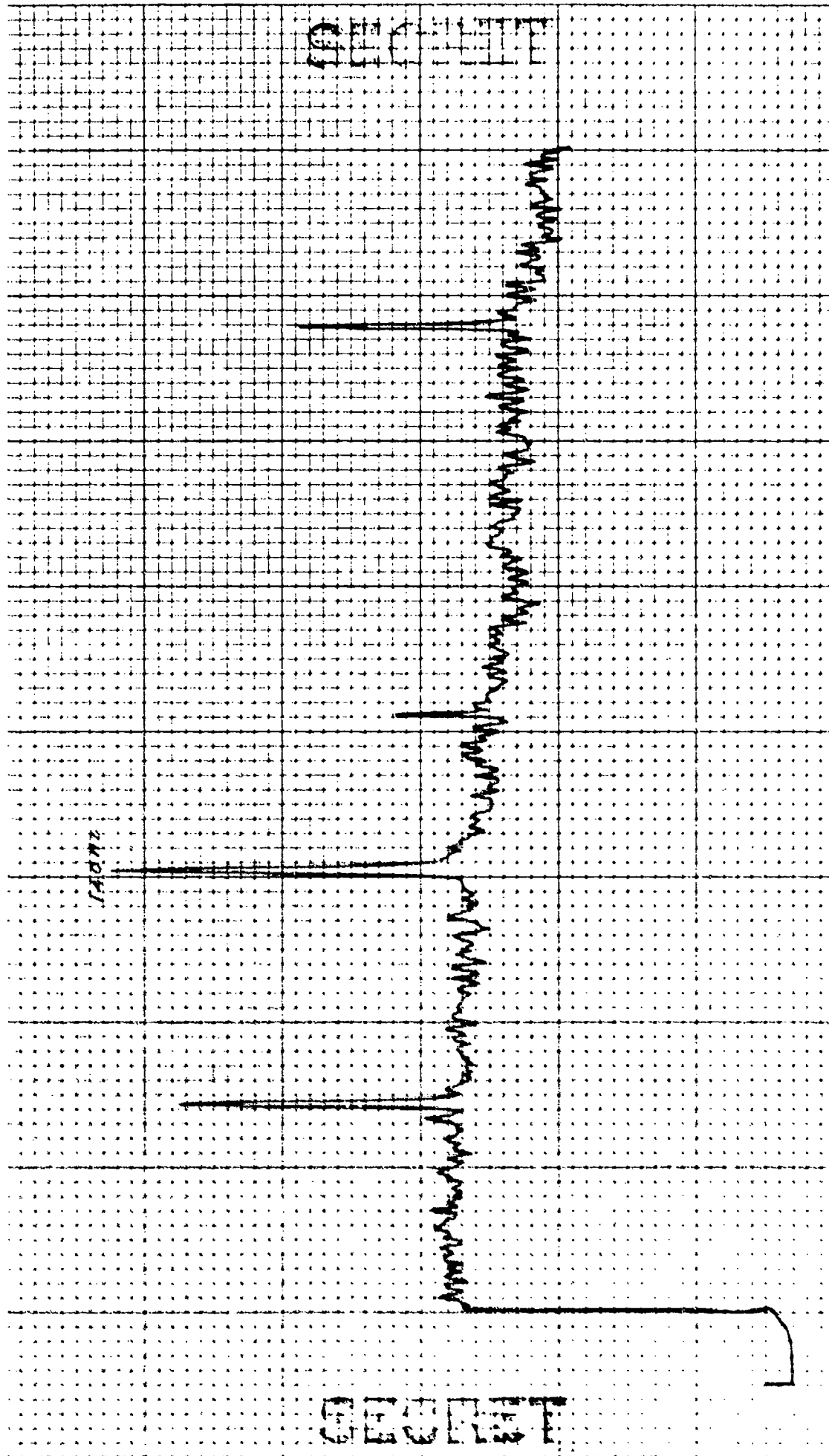
46 0703

CONTROL: 2137 - 16 (DPI)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - -  
1-16

DATE/TIME: 3-25-77 - 2137.2  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 42 DEG. AZ STEERING

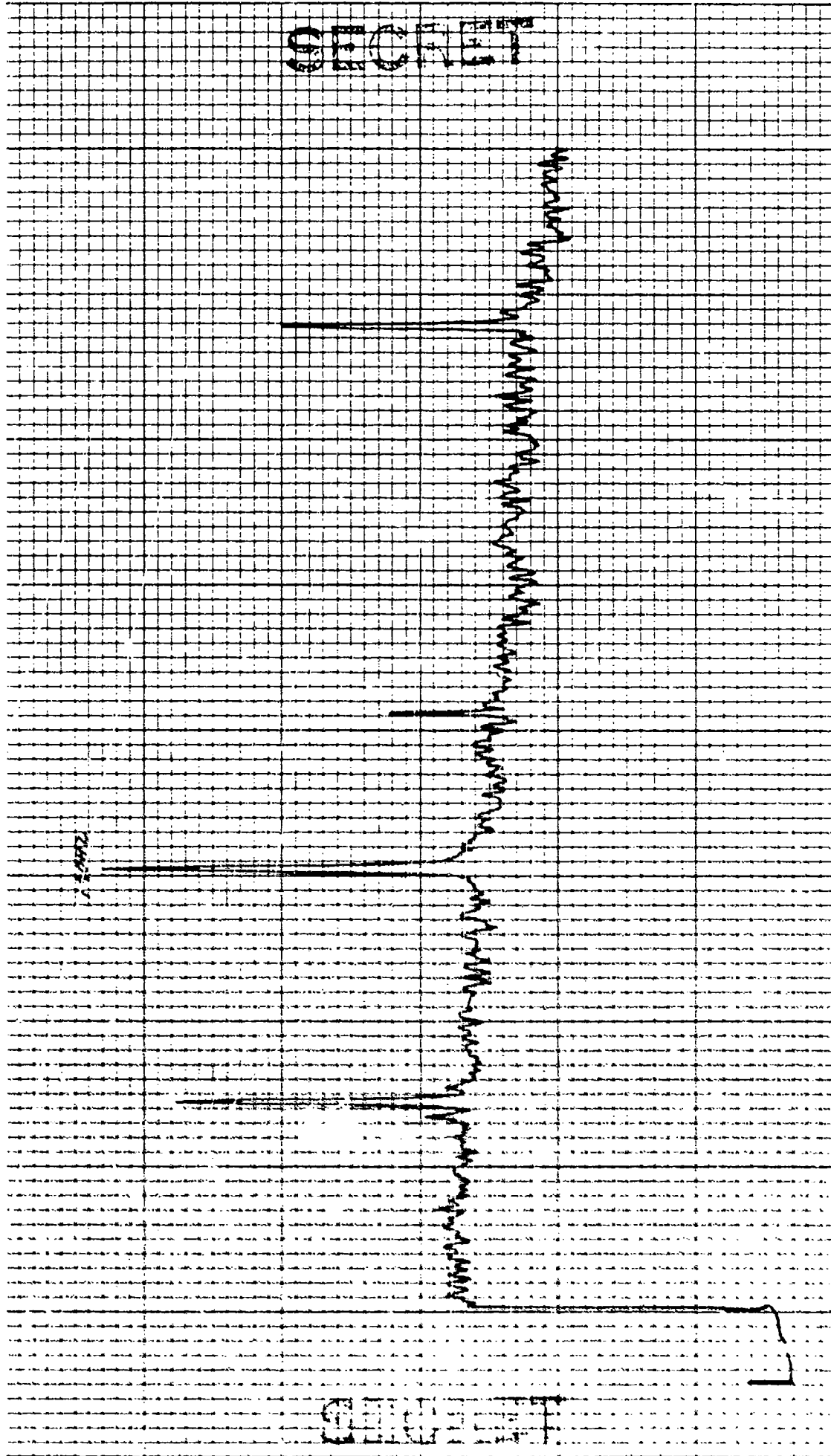
REEL: 110  
INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER WTG: HANNING  
INDE XJ720



K-E 10 X 10 TO THE INCHES 1 X 10 INCHES  
KELUPPEL & CYSEER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (200) DATE OF ANALYSIS: 1-76 REEL: 110 INDE X 3620  
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-5-77 - 2131/2 INTEGRATION TIME 320 SECS ATTN: -12 DB  
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING  
CENTER FREQ: 150HZ +44 DEG. 27 STEERING



KOE IS 10 TO THE INCHES  
REURFEL & CO. INC. MADE IN U.S.A.

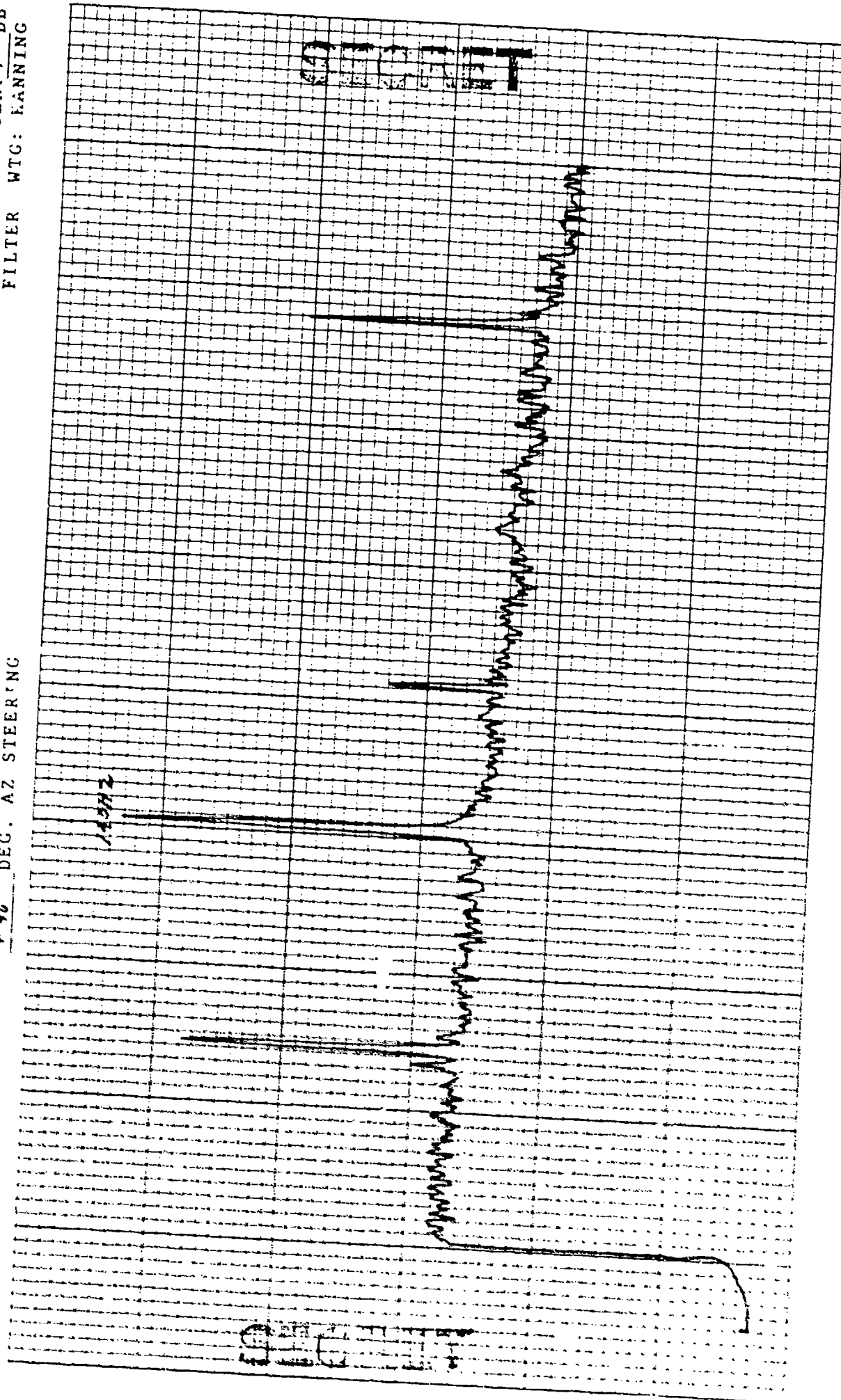
46 0703

CONTROL: 2231 - 16 (009)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: REARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-5-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 46 DEG. AZ STEERING

REEL: M10  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: 72 DB  
WTG: HANNING

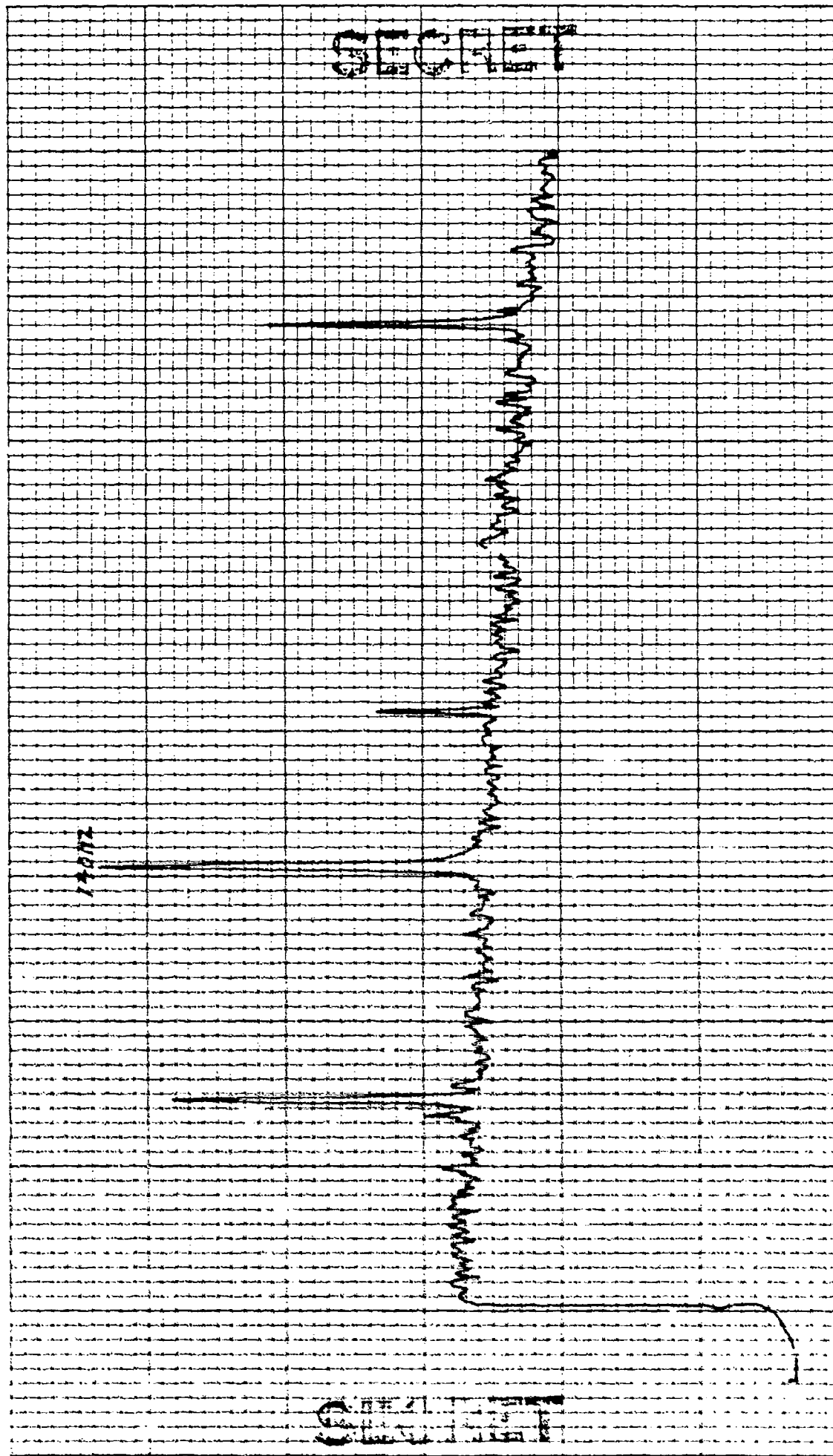
INDE X3620



46 0703

REEL: 410  
INTEGRATION TIME 320 SECS  
FILTER  
ATTN: 7.5 DB  
WTC: HANNING  
INDEX 3820

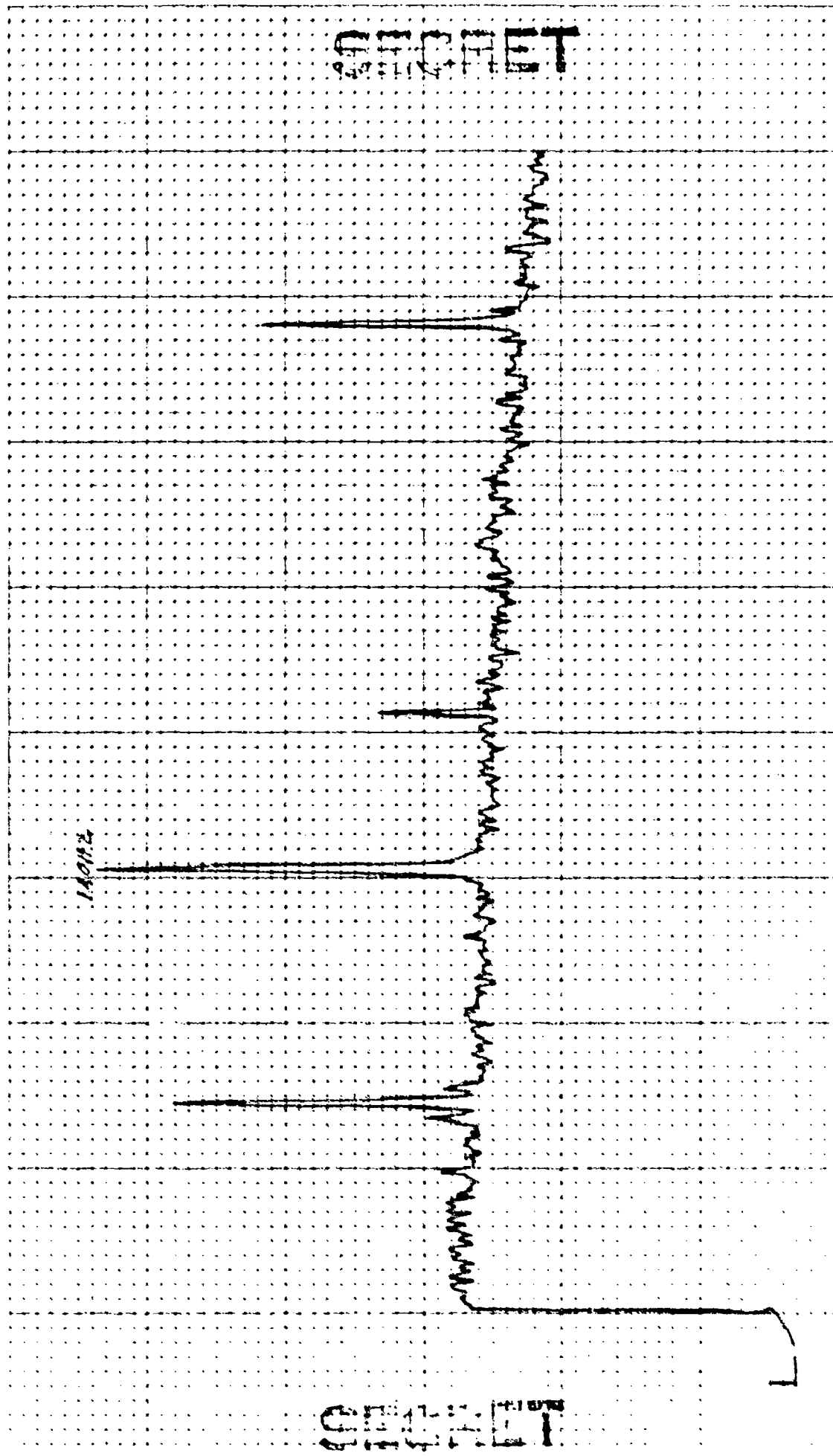
DATE OF ANALYSIS: 1-16 )  
DATE/TIME: 7-15-77 - 2131Z  
ANALYS S BANDWIDTH: 1/10HZ  
+ 48 DEG. AZ STEERING



NOE 11/11/77 11:11:11

46 0703

CONTROL: 2131 - 16 (DB9)      DATE OF ANALYSIS: 11-16-77      PEEL: A10      INDE X3200  
BEAMFORMED SPECTRUM/ELEMENTS: 16      DATE/TIME: 11-16-77 - 2131 Z      INTEGRATION TIME 320 SECS      ATTEN: -2. DB  
EXERCISE: BEARING STAYE      ANALYSIS BANDWIDTH: 1110HZ      FILTER WTC: HANNING  
CENTER FREQ: 150 HZ      450 DEG. AZ STEERING



K-E 18.5 IN TO THE DEPT. 1.5 INCHES  
FUEL 1.5 INCHES

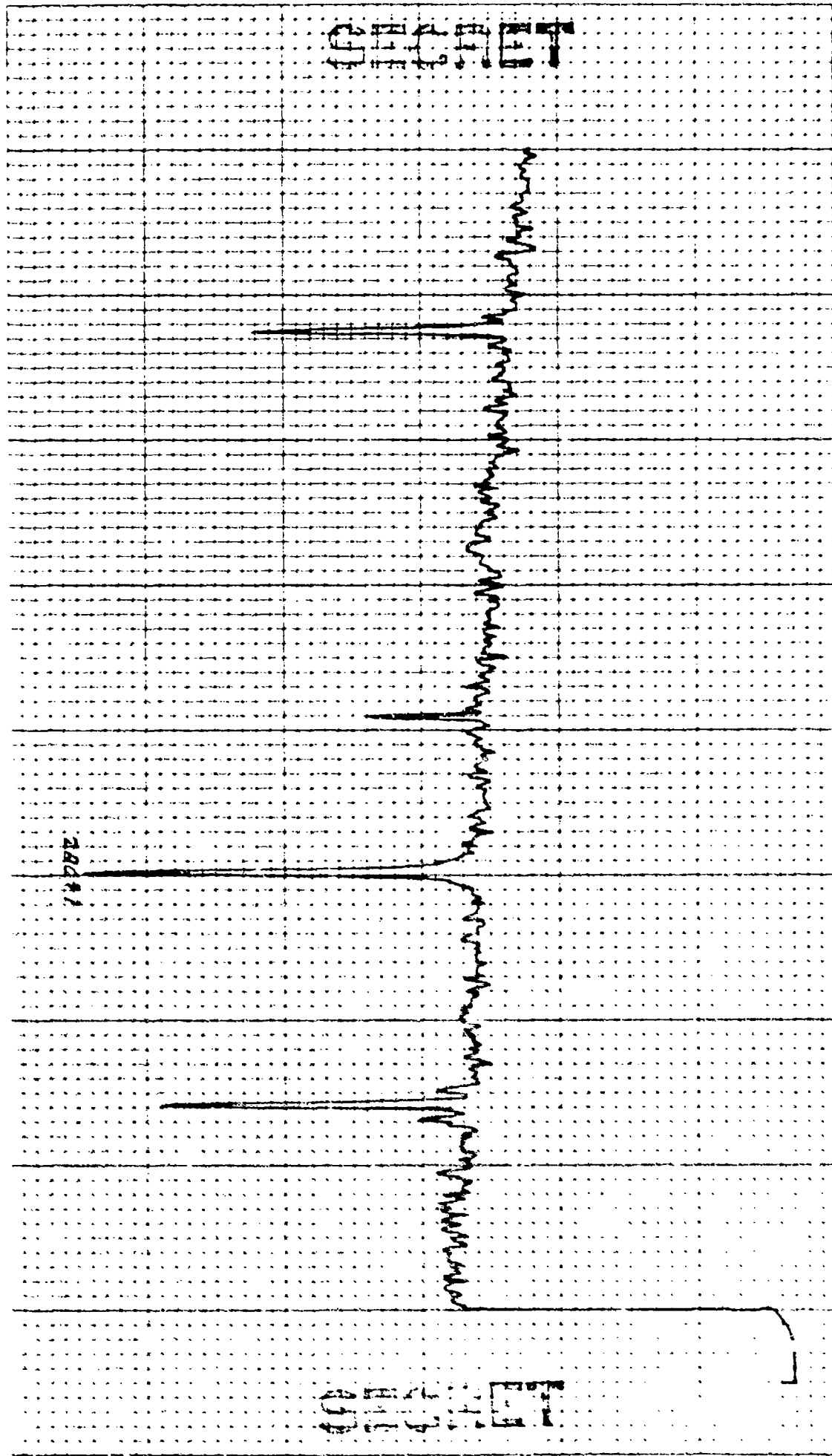
46 0703

CONTROL: 2001 - 16 (000)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 373.75 - 2001 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+505 DEG. AZ STEERING

REEL: 110  
INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: 1/2 DB  
FILTER WTC: HANNING

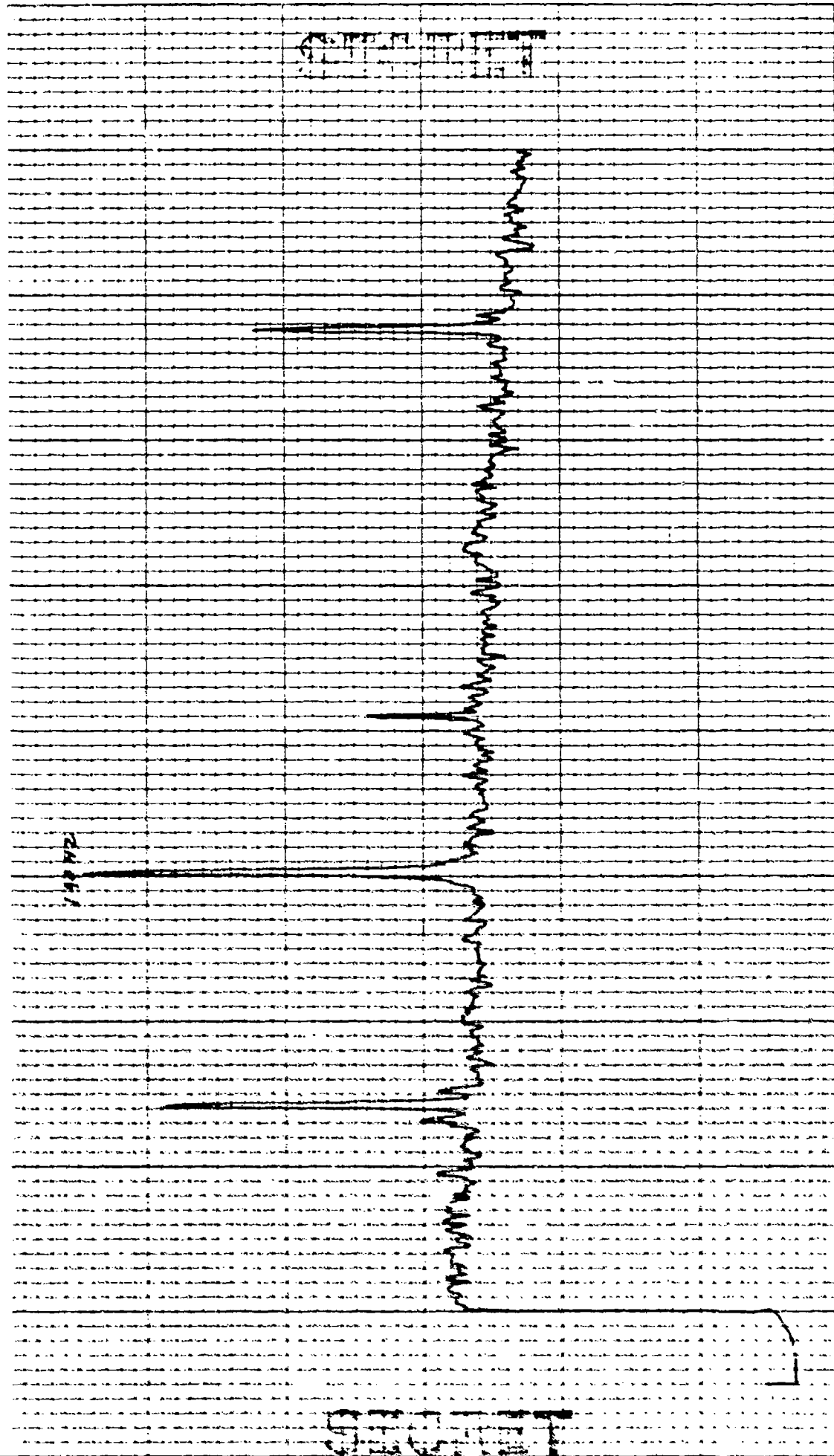




10 X 10 TO THE 10th POWER  
RECEIVED AT THE 10th POWER

46 0703

CONTROL: 2131 - 16 (DPG) REEL: 400 INDEX: X 200  
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 2 DB  
EXERCISE: BEARING STAKE FILTER WTC: HANNING  
CENTER FREQ: 150 HZ  
16 ELEMENTS  
DATE OF ANALYSIS: 1-16  
DATE/TIME: 7-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 51 DEG. AZ STEERING



KOE 10.15 TO 10.16 HOURS  
RECEIVED 10.16 HOURS

46 0703

EXERCISE

CONTROL: 211 - 51 (DP1)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

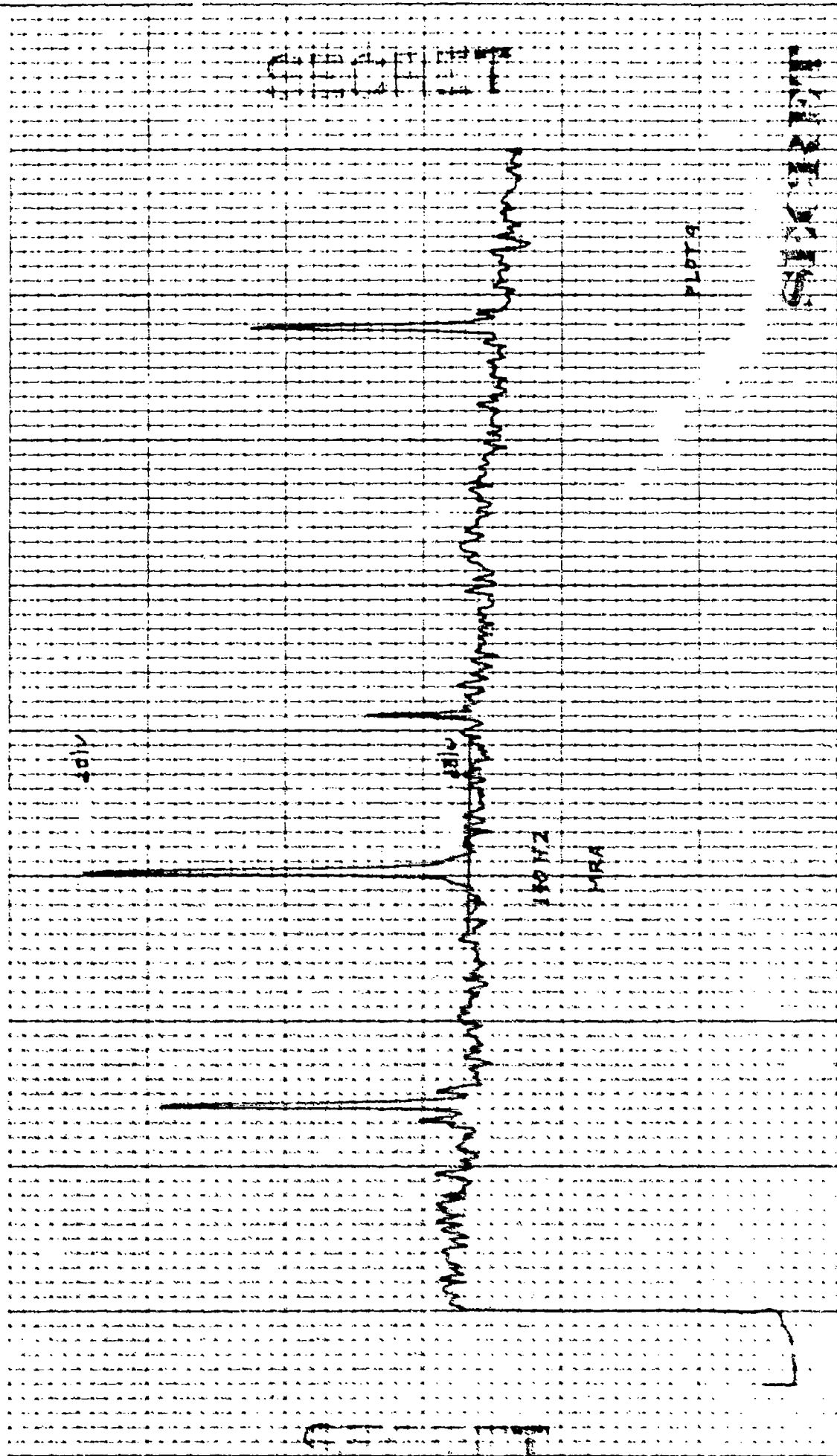
DATE OF ANALYSIS: ---

DATE/TIME: 7/577 - 211/ Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
45.5 DEG. AZ STEERING

REEL: M10

INTEGRATION TIME 320 SECS  
ATTEN: - DB  
FILT: HANNING

INDEX 7620



111 HZ

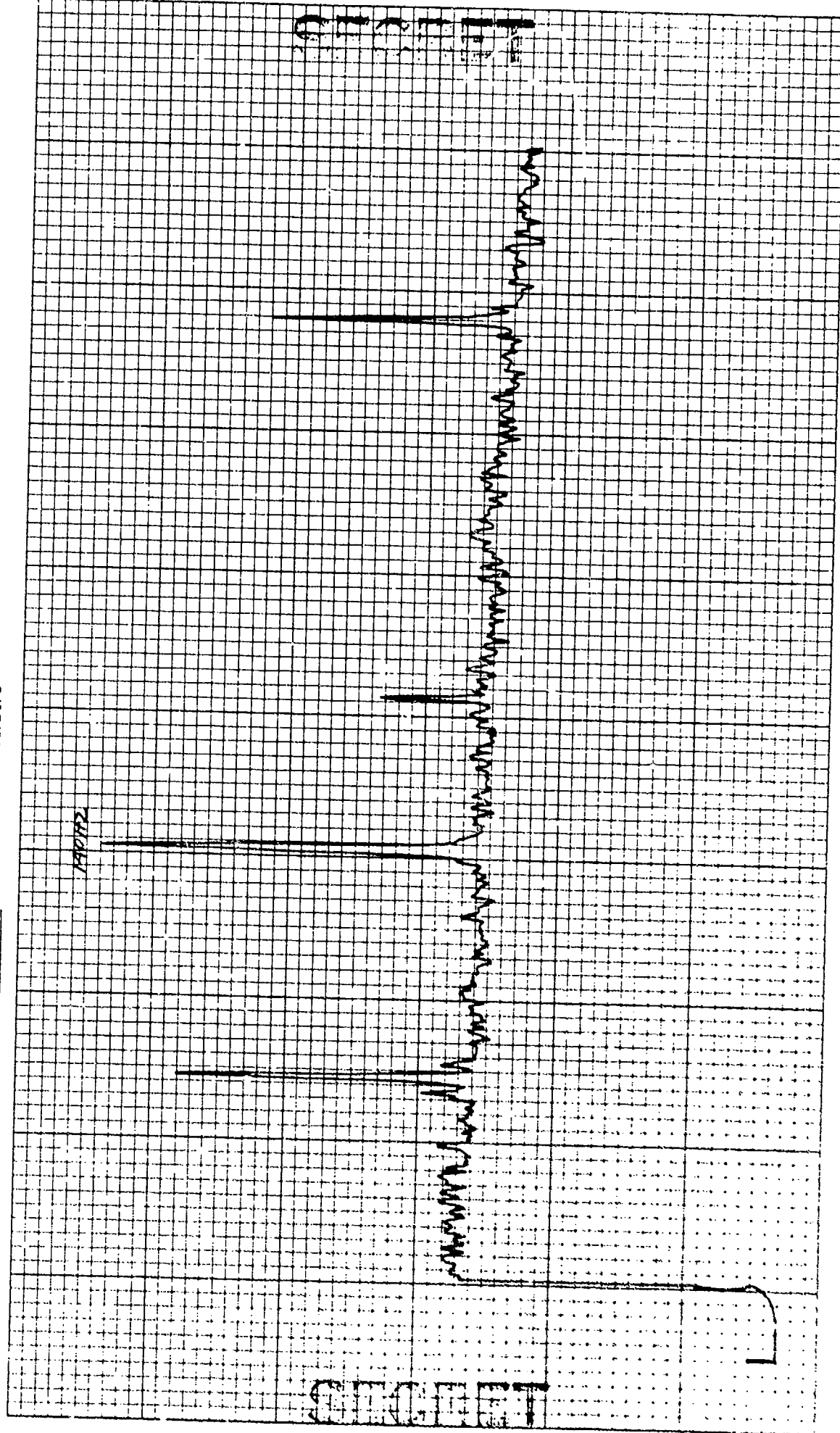
150 HZ

180 HZ

CONTROL: 2131 - 16 (289)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 52 DEG. AZ STEERING

REEL: 110  
INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: -72 DB  
FILTER WTC: HANNING



46 0703

CONTROL: 2131 - 16 (289)  
BEAMFORMED SPECTRUM ELEMENTS  
EXERCISE: BEARING STAVE  
CENTER FREQ: 150 KHZ  
DATE OF ANALYSIS: - - - -  
DATE/TIME: 1-16-77 - 2131 Z  
ANALYSIS BA WIDTH: 1710HZ  
+54 DEG. OF STEERING  
16 ELEMENTS  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: 72 DB  
WTG: HANNING  
REEL: 1110  
INDEX: 2220

14082

~~SECRET~~

**SECRET**

[illegible]

10-2  
K-2 3000 TO 30000 HZ

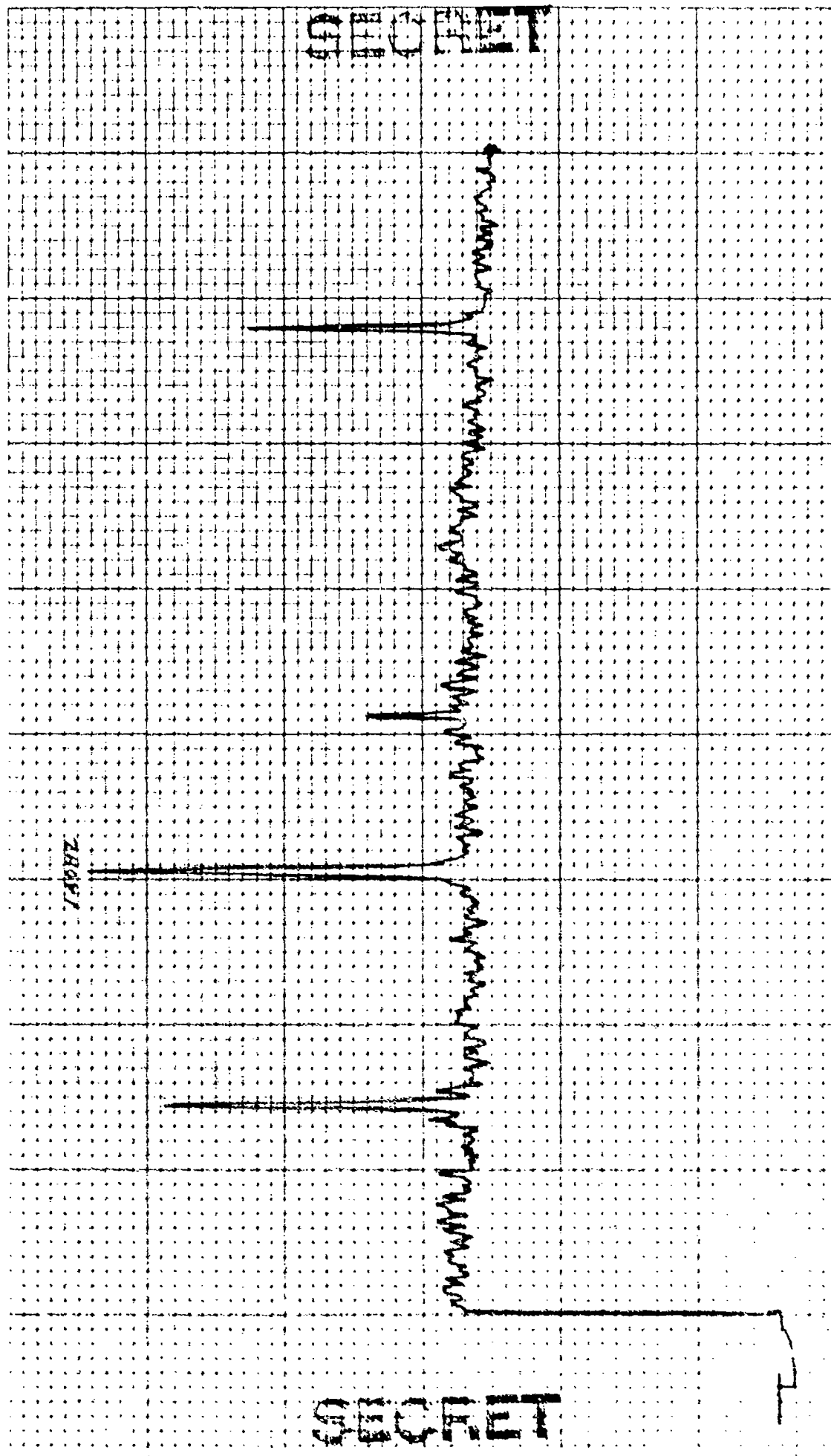
46 0703

CONTROL: 2131 - 16 (100)  
BEAMFORMED SPECTRUM/ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - -  
1 - 16  
DATE/TIME: 7-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 11/10 HZ  
+56 DEG. AZ STEERING

REEL: 110 INDEX: 2620

INTEGRATION TIME 320 SECS ATTEN: 72 DB  
FILTER WTG: HANNING



46 0703

CONTROL: 2131 - 16 (DP9);  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEAPING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

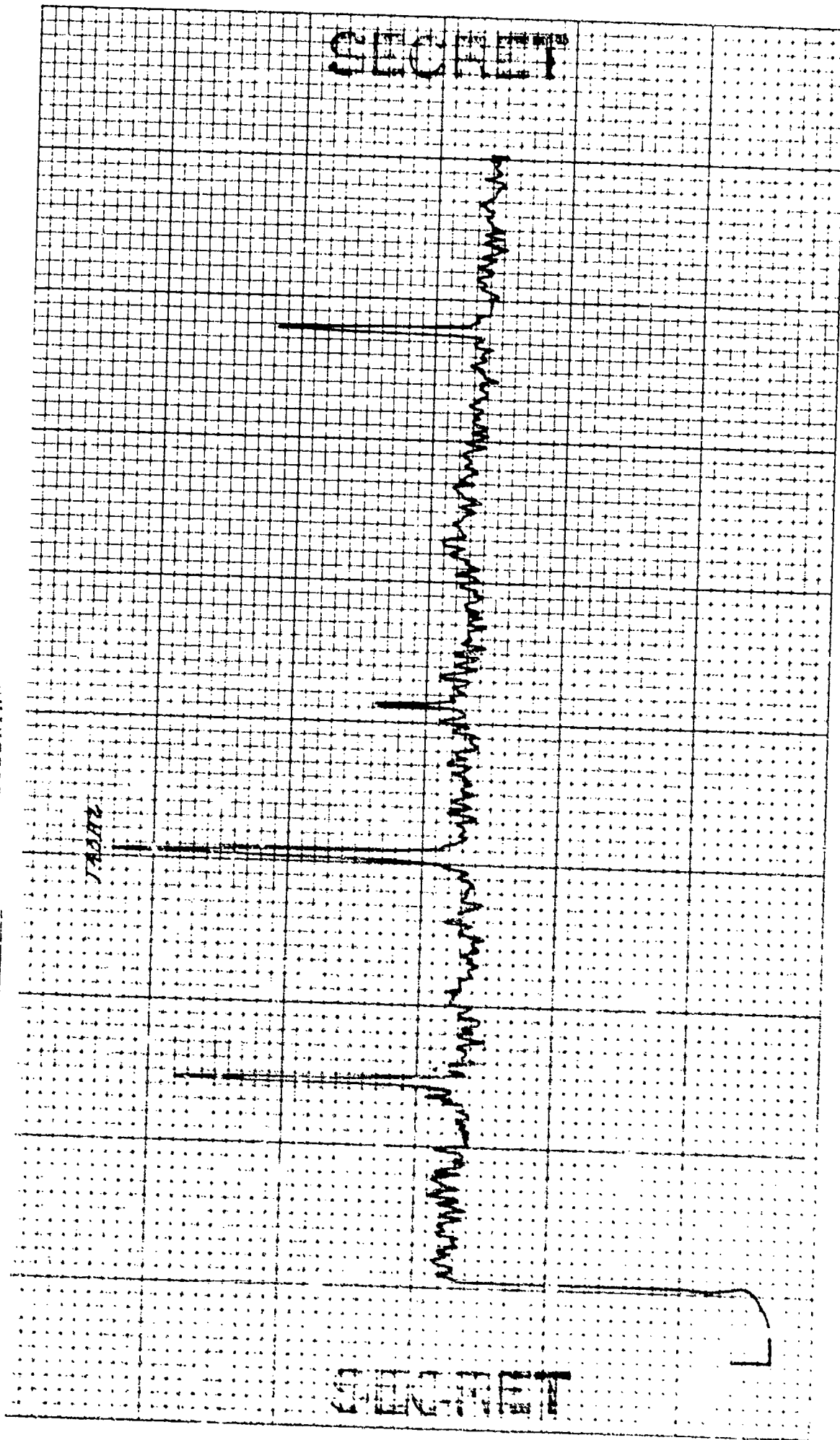
DATE OF ANALYSIS: - - - - -  
1-16  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWILTH: 1/100Z  
#50 DEG. A: STEERING

REEL: 110 INDEX X3628

INTEGRATION TIME 320 SECS      ATTN:- 3 DB  
FILTFR      WTG: HANNING

# SECRET

**SECRET**



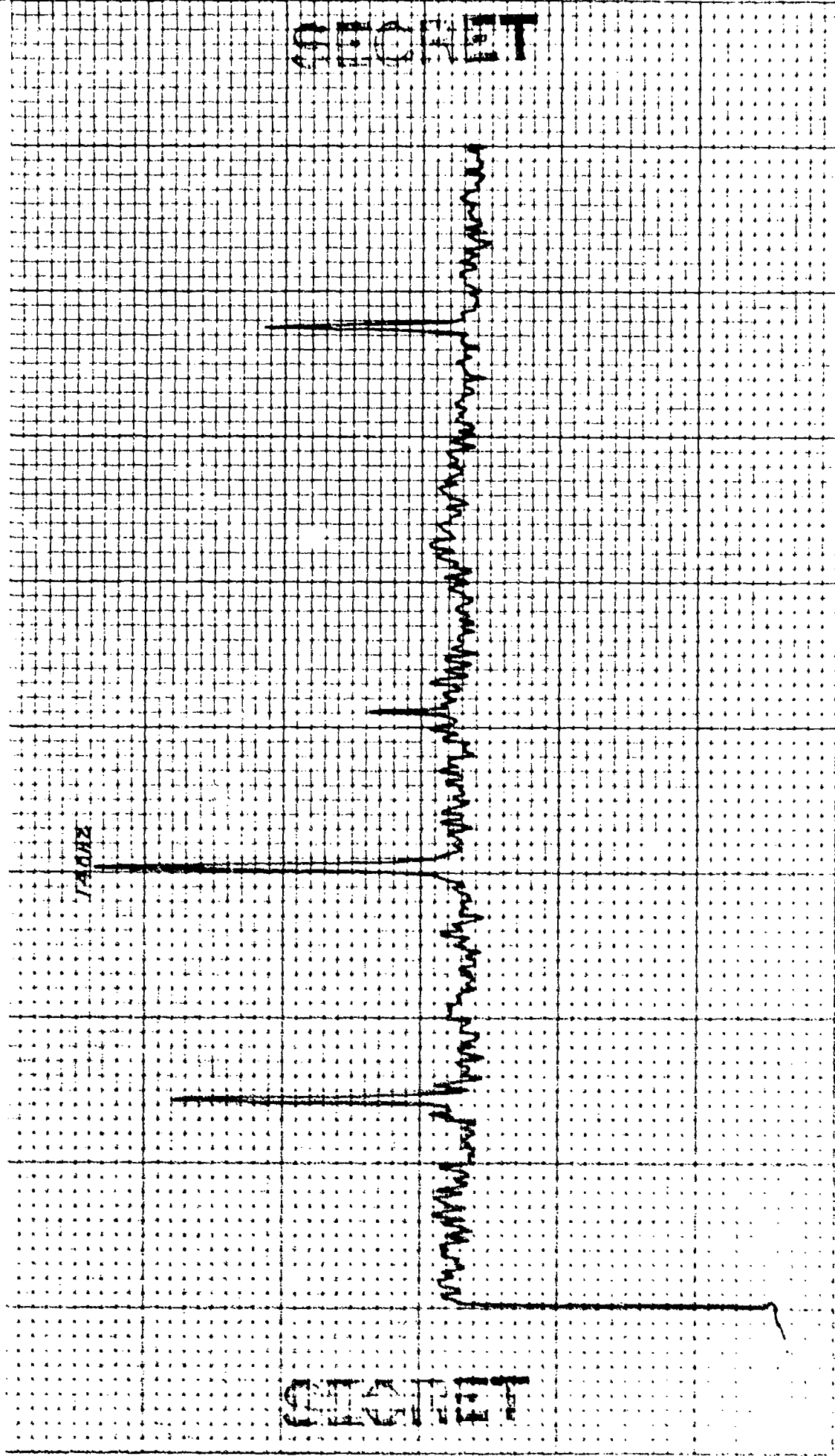
KOE 12 X 16 TO THE INCH... 1/2 INCHES  
PAPER & ENVELOPE CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (209)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - - - -  
1-16  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+60 DEG. AZ STEERING

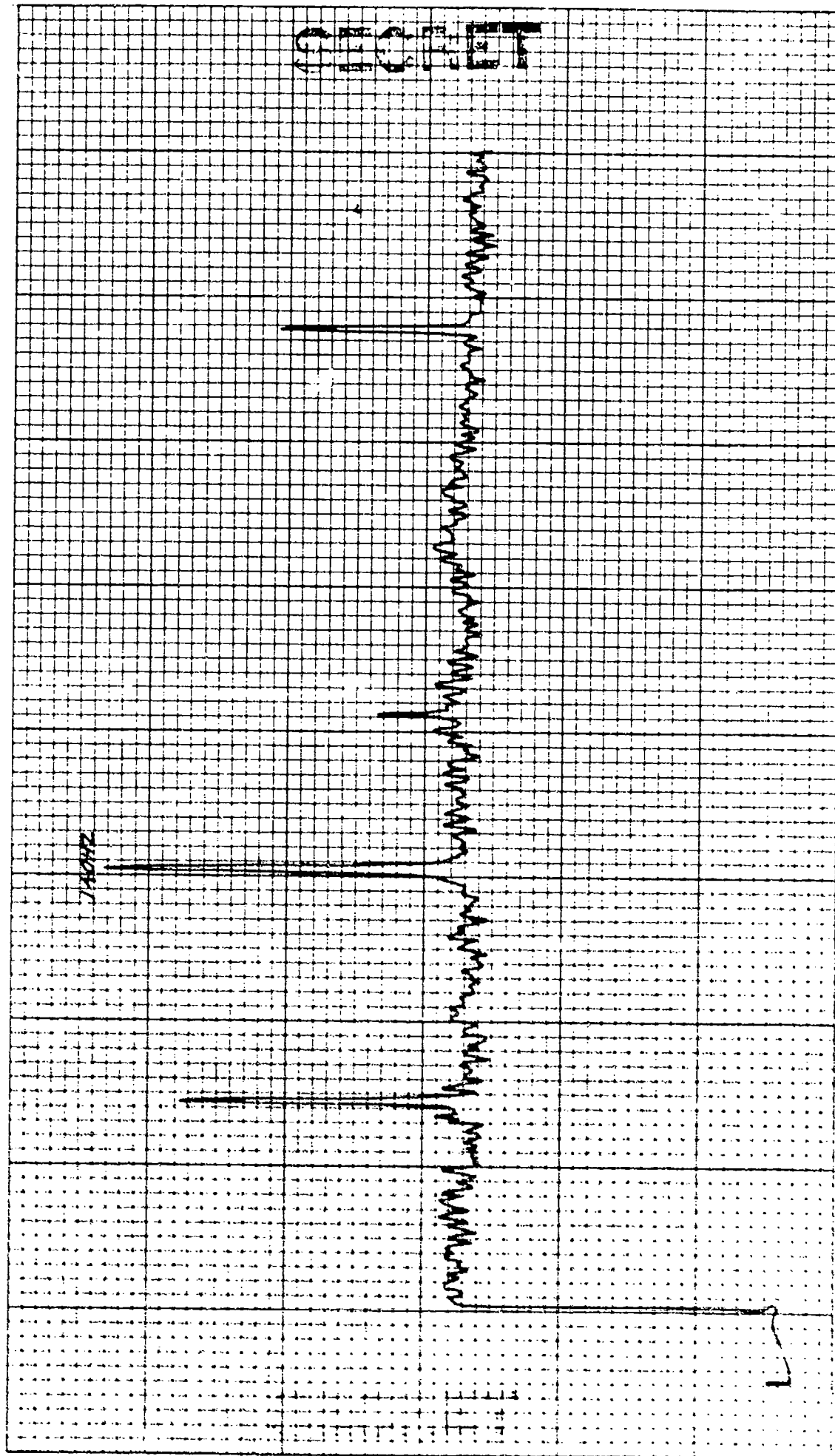
REEL: 410 INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: 72 DB  
FILTER WTC: HANNING



CONTROL: 2131 - 16 (200)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+62 DEG. AZ STEERING

REEL: 410 INDE X3000  
INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER  
WTG: HANNING





K-E 10 X 10 TO THE INCH • 7 X 10 HICHES  
KEUFFEL & ESSER CO. MADE IN U.S.A.

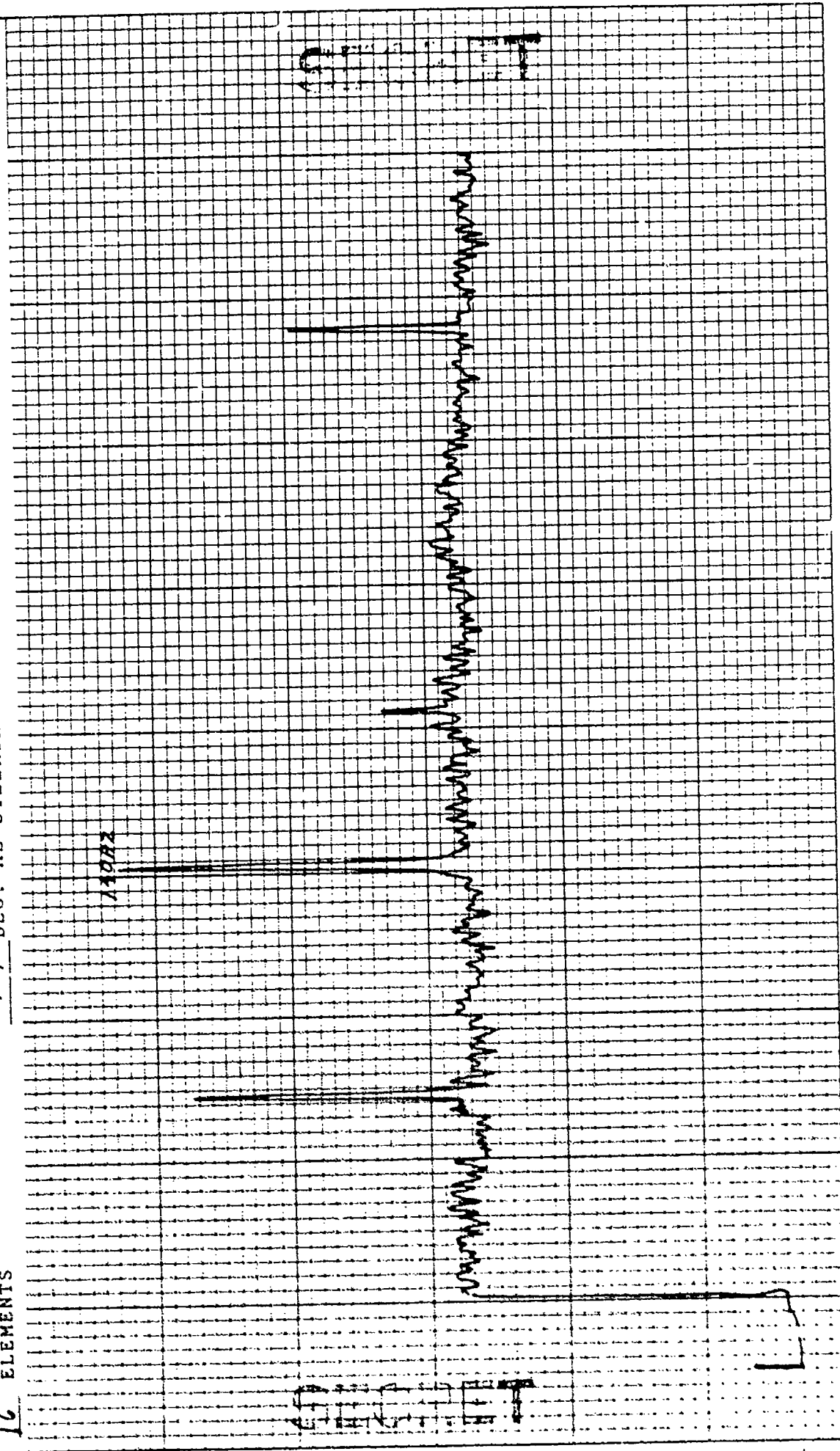
46 0703

CONTROL: 2131 - 16 (DPY)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-13-07-2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+64 DEG. AZ STEERING

REEL: 410 INDE X 7620

INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
WTG: HANNING  
FILTER



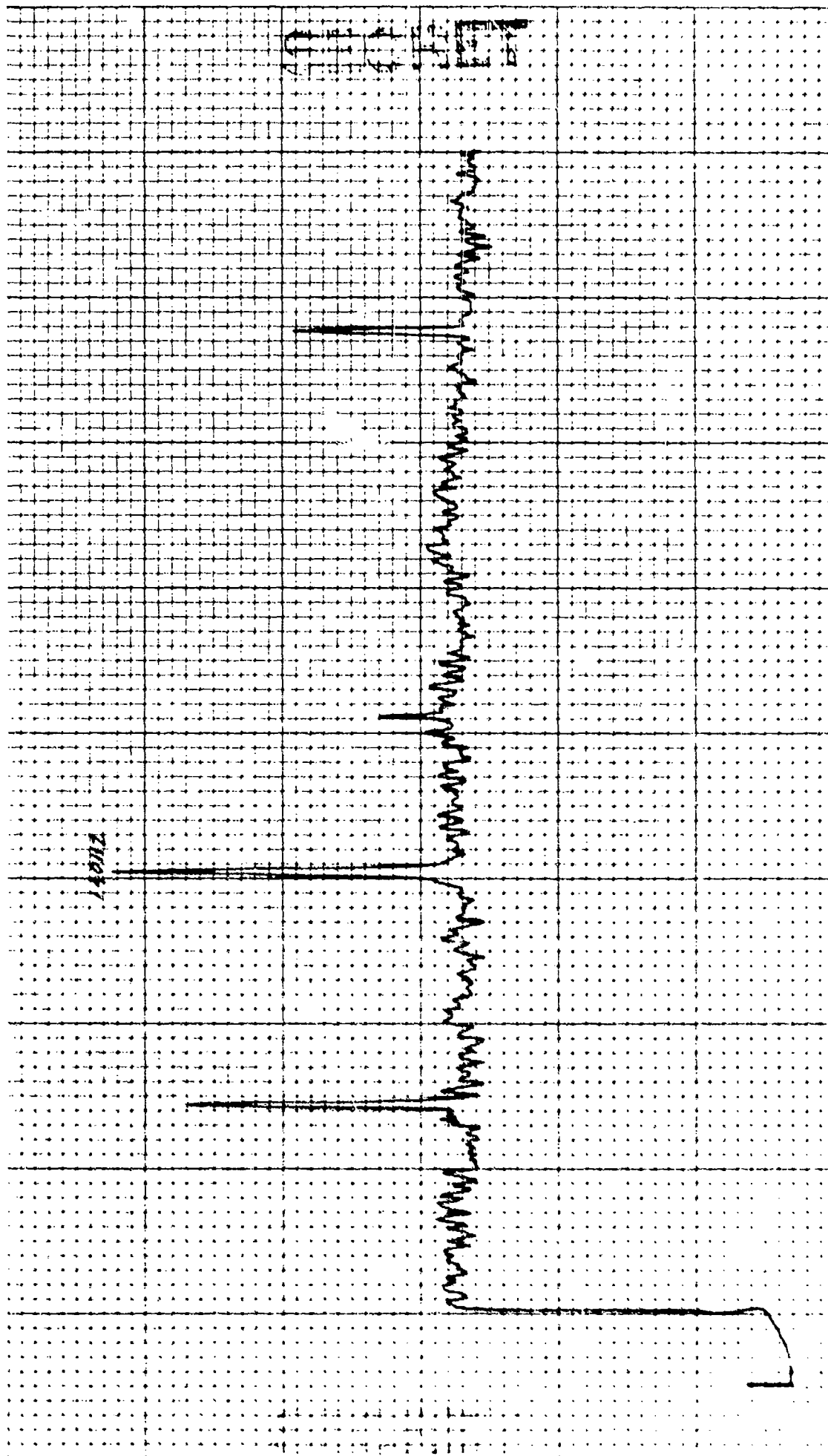
KOE 16 X 16 TO THE INCH - 7 1/2 INCHES  
PAPER & LETTER CO. (MILITARY)

46 0703

CONTROL: 2131 - 16 (2131)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - -  
1-16 )  
DATE/TIME: 3-25-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 66 DEG. AZ STEERING

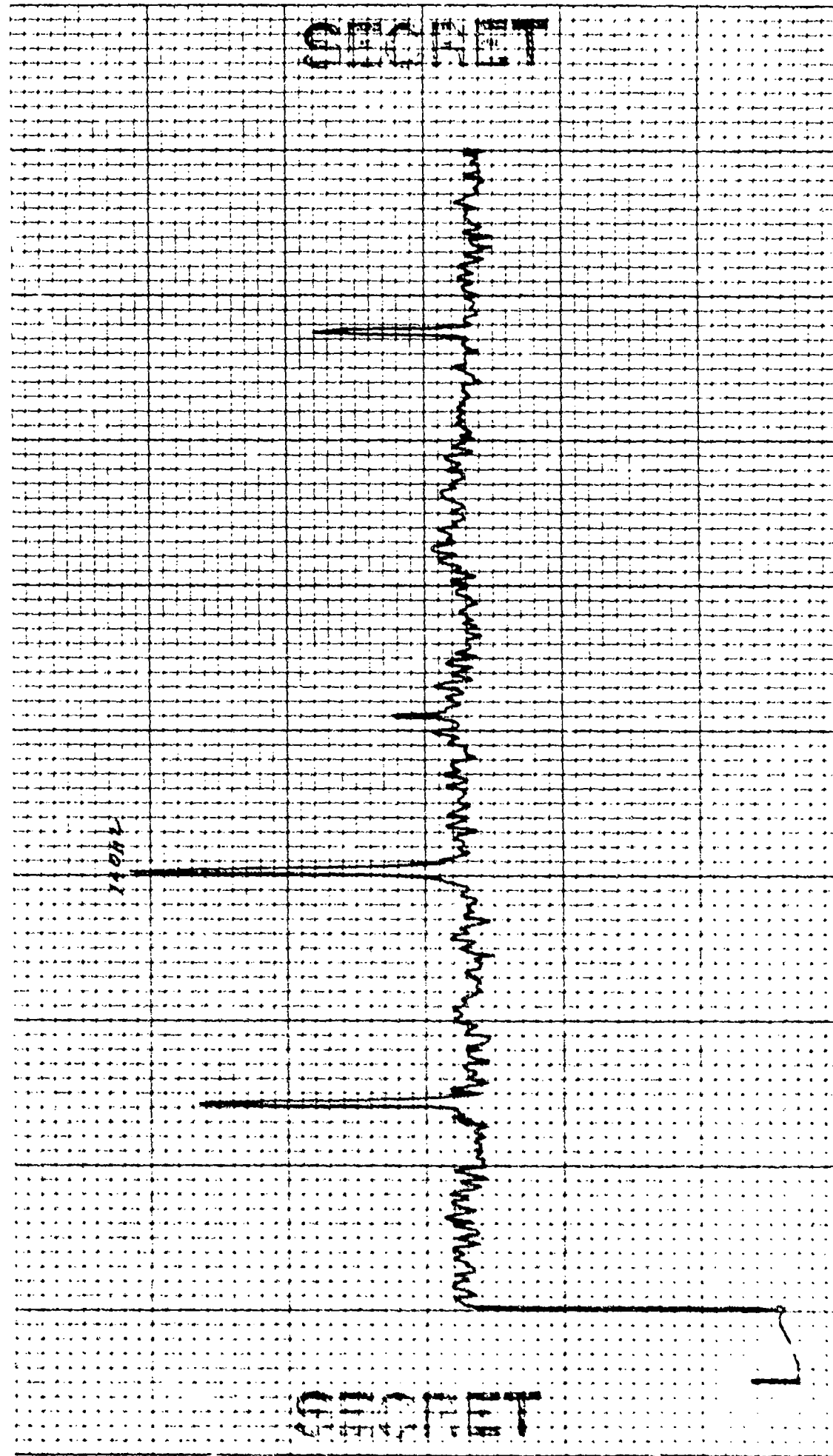
REEL: 413 INDE X 22  
INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER WTC: HANNING



KOE 10 X 10 TO THE INCHES 2 1/2 INCHES  
PAPER COVER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DAP) REEL: A10 INDE X3600  
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16  
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 3-13-72  
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710 HZ  
16 ELEMENTS 60 DEG. AZ STEERING FILTER WTC: HANNING  
ATTEN: 24 DB



301

FILE # 3620

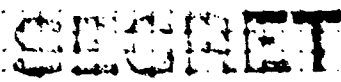
4444:1110

ATTN: -12 DE  
WTC: HANING

INTEGRATION TIME 320 SECS  
FILTER

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-5-77 - 2130 Z  
ANALYST: BANDWIDTH: 1/10HZ  
+36 DEG. AZ STEERING

CONTROL: 2131 - 16 (DOE)  
 BELAMPOFOMED RECTUM ELEMENT,  
 EXCEPT, E: BEARING STAYE  
 CENTER PPT: 27042  
 76 ELEMENT.



KOE 15.10 TO THE DEPT. OF DEFENSE

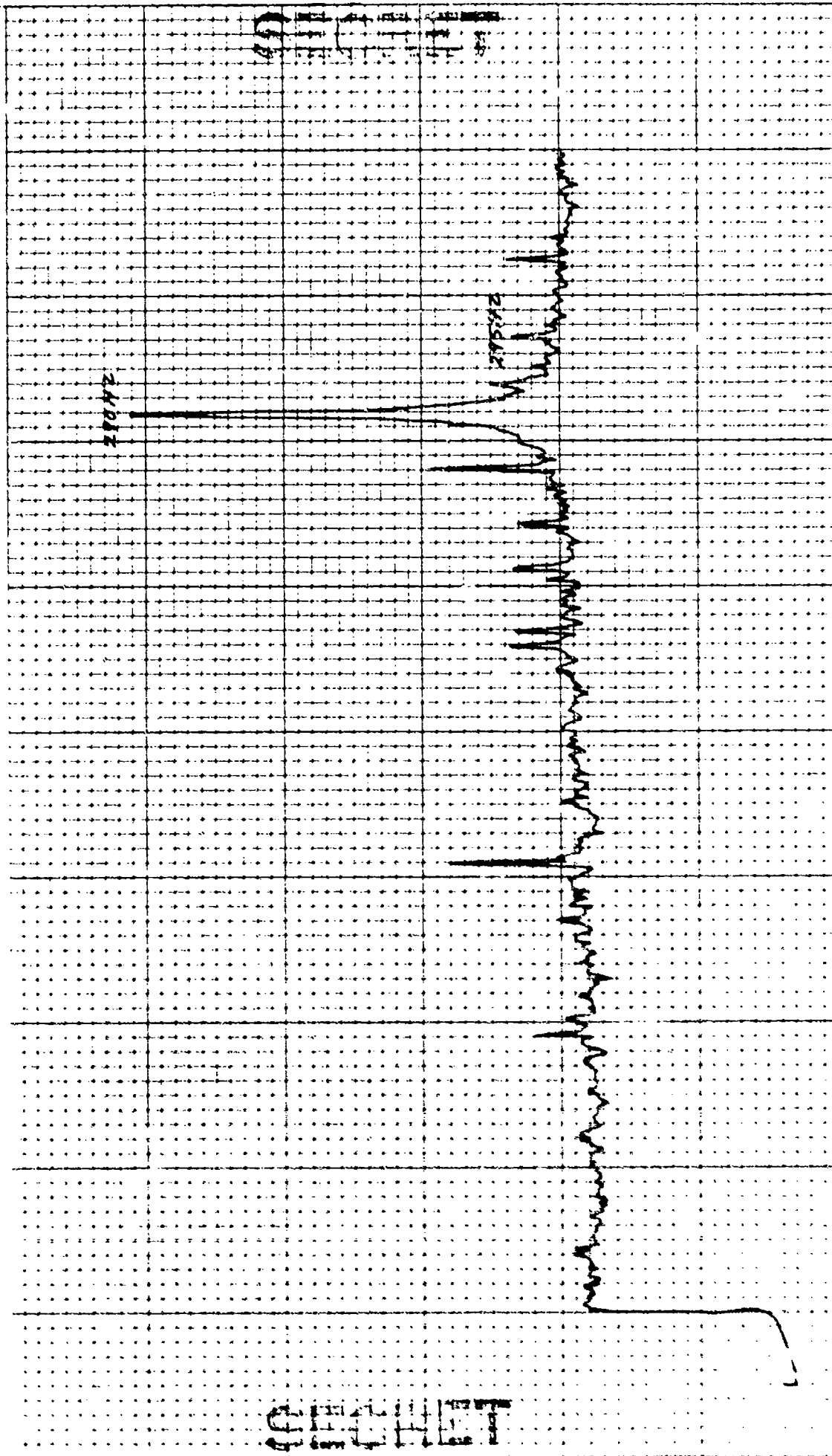
46 0703

CONTROL: 2071 - 16 (2071)  
BEAMFORMED SPECTRUM ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 7-8-77 - 2031 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 30 DEG. AZ STEERING

REEL: 410 INDE X3620

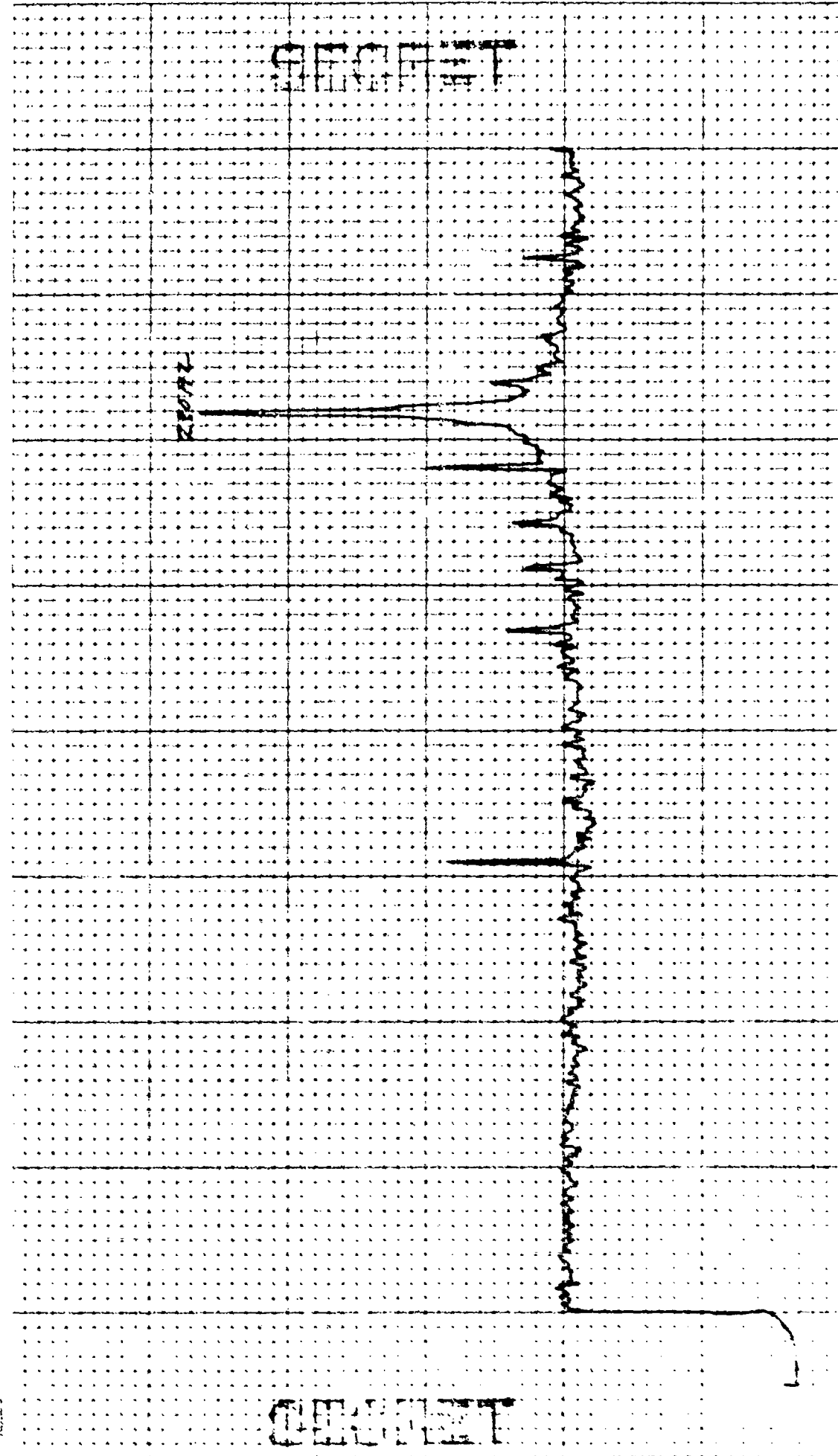
INTEGRATION TIME 320 SECS  
ATTEN: 72 DB  
FILTER WTG: HANNING



KOE 10.5 NS TO THE HORN OF AFRICA

46 0703

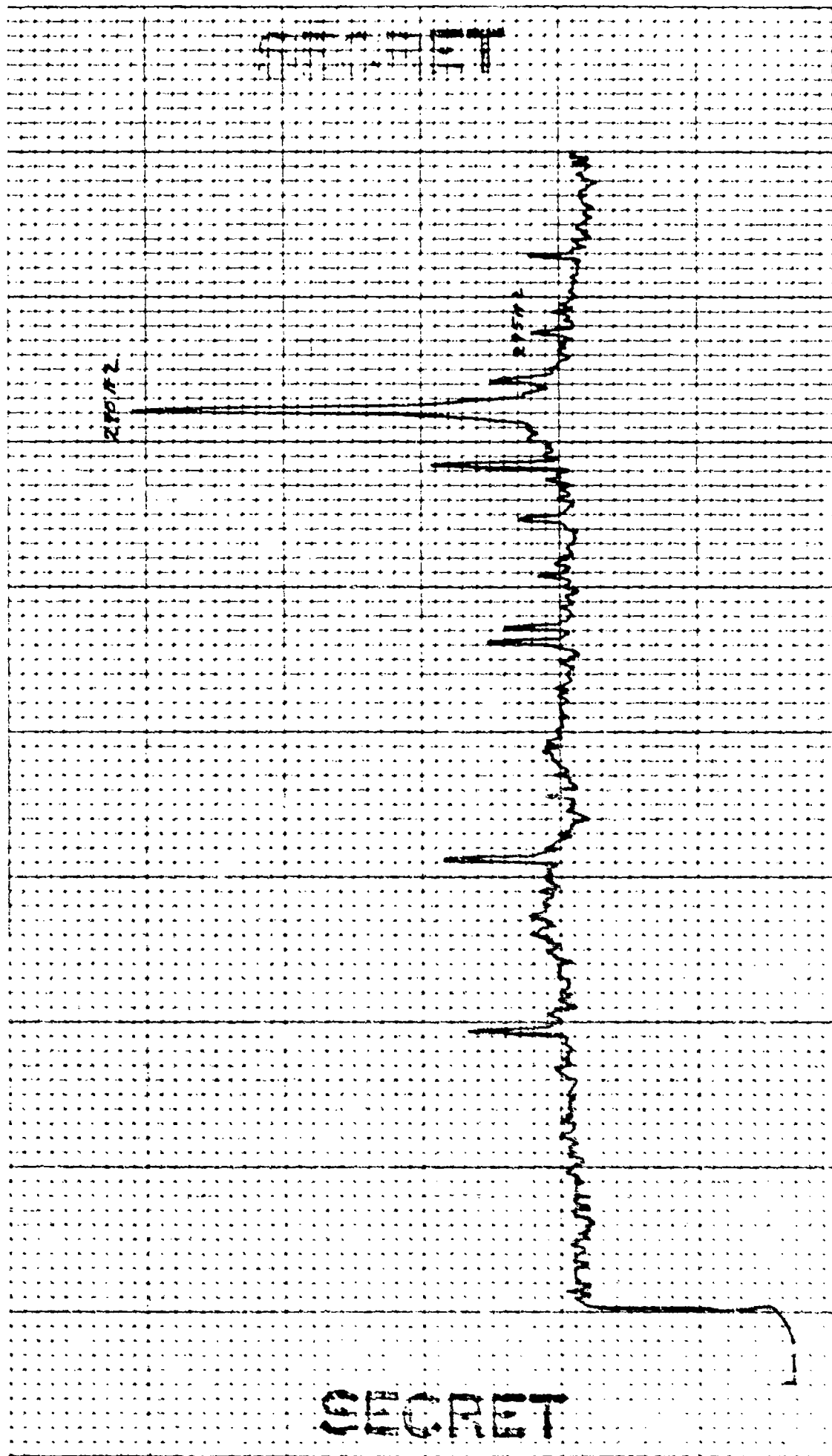
CONTROL: 2031 - 16 (DM)      DATE OF ANALYSIS: 1-16      REEL: H10      INDE K3620  
BEAMFORMED SPECTRUM/ELEMENTS      DATE/TIME: 3-15-77 - 4131 Z      INTEGRATION TIME 320 SECS      ATTN: 12 DB  
EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
CENTER FREQ: 270 HZ      +40 DEG. AZ STEERING



K.E. 19.7 19 TO THE INCHES. 2.5.00.00.00.

46 0703

CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-10 REEL: 410 INDE X3600  
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB  
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING  
CENTER FREQ: 270 HZ +42 DEG. AZ STEERING



46 0703

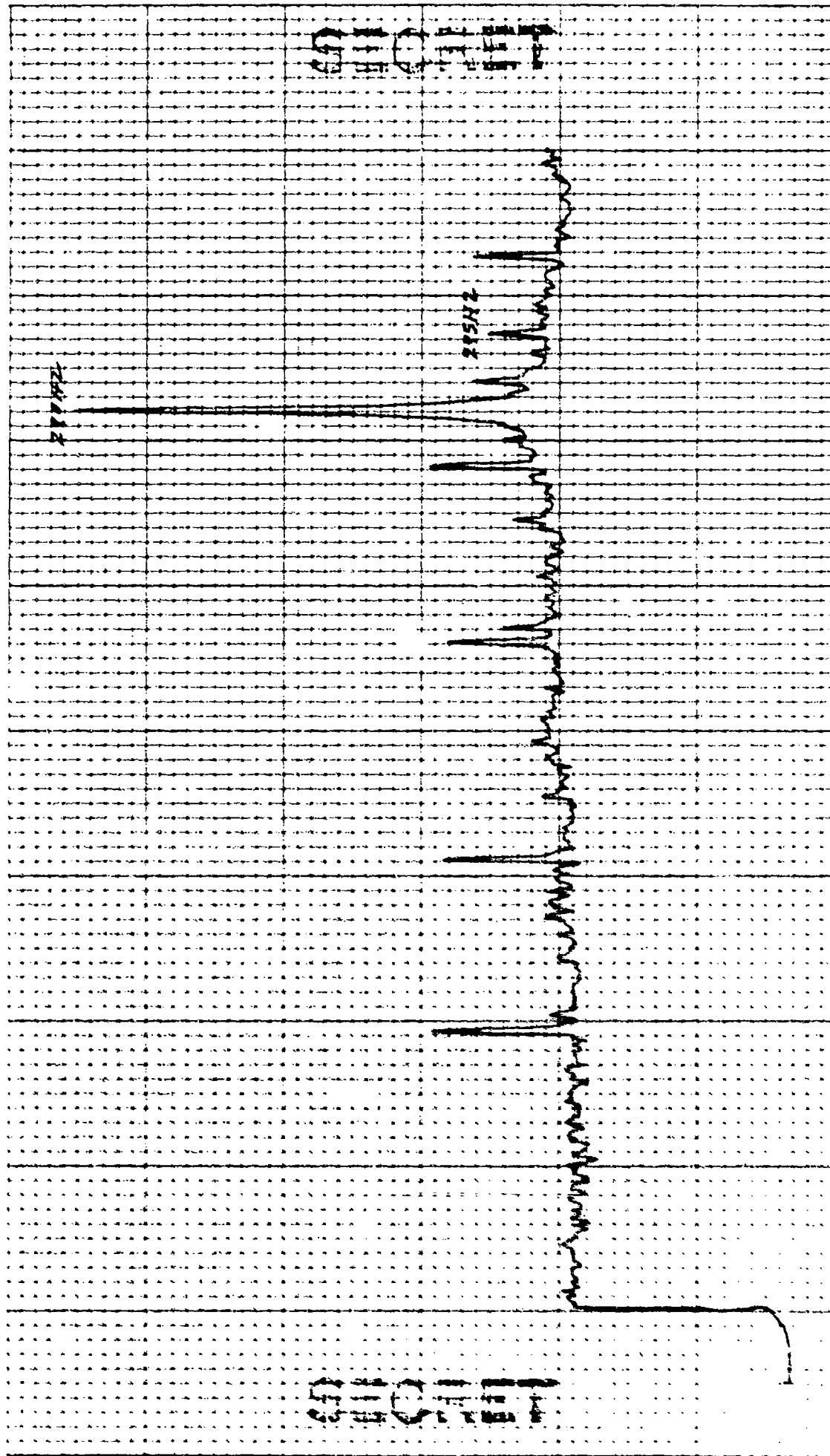
CONTROL: 231 - 16 (DP 1)  
BEAMFORMED SPECTRUM ELEMENTS  
EXERCISE: BEARING STAFF  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-25-77 - 2032  
ANALYSIS BANDWIDTH: 1/10HZ  
4.54 DEG. AZ STEERING

INTEGRATION TIME 320 SECS  
FILTER

ATTEN: 72 DB  
WTC: HANNING

REEL: A10  
INDEX X 2620

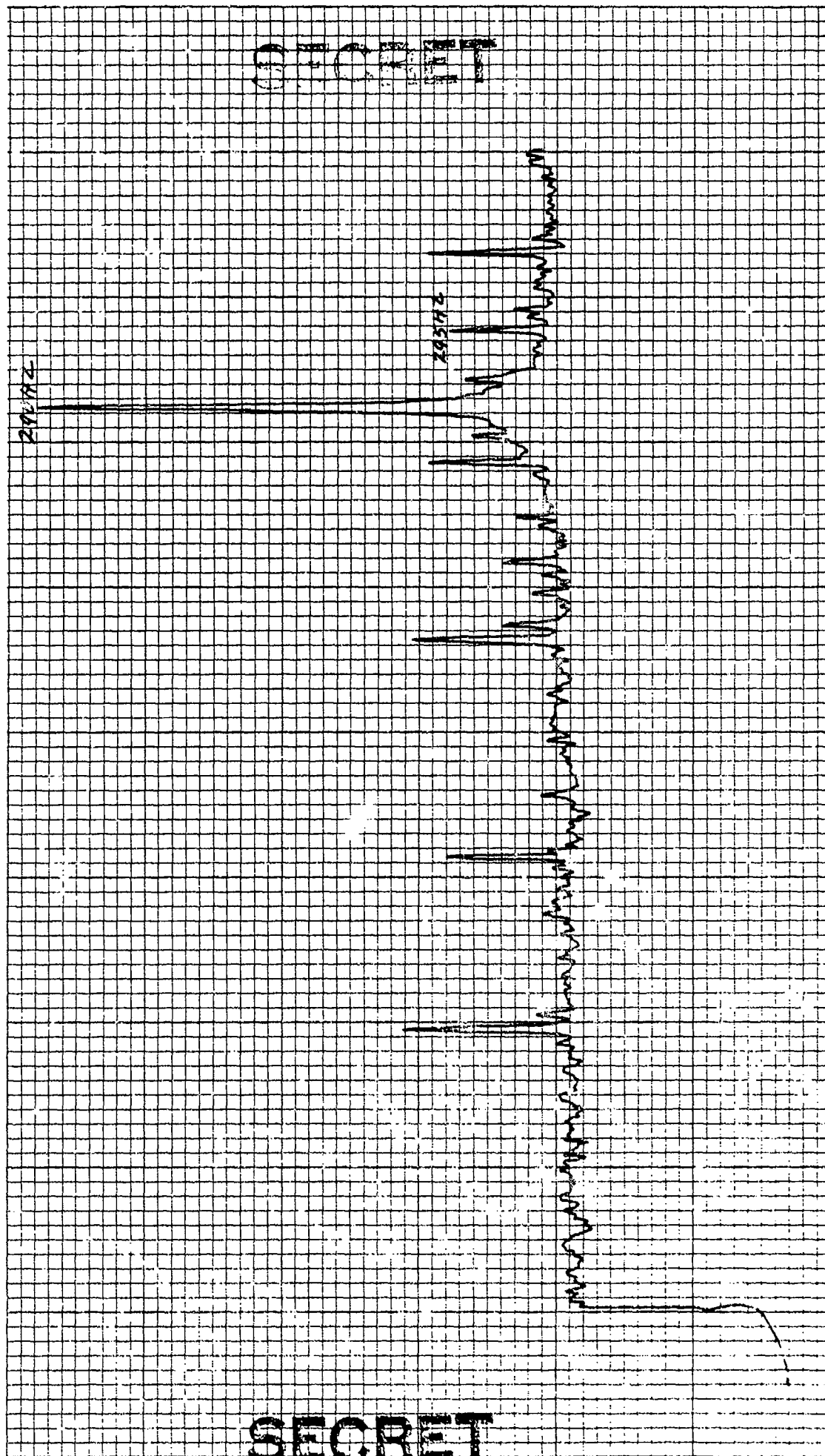




CONTROL: 2131 - 16 (DPP)  
BEAMFORMED SPECTRUM (ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
46 DEG. AZ STEERING

REFL: 410  
INDE X 3620  
INTEGRATION TIME 320 SECS  
ATTEN: -72 DB  
FILTER WTG: HANNING



SECRET

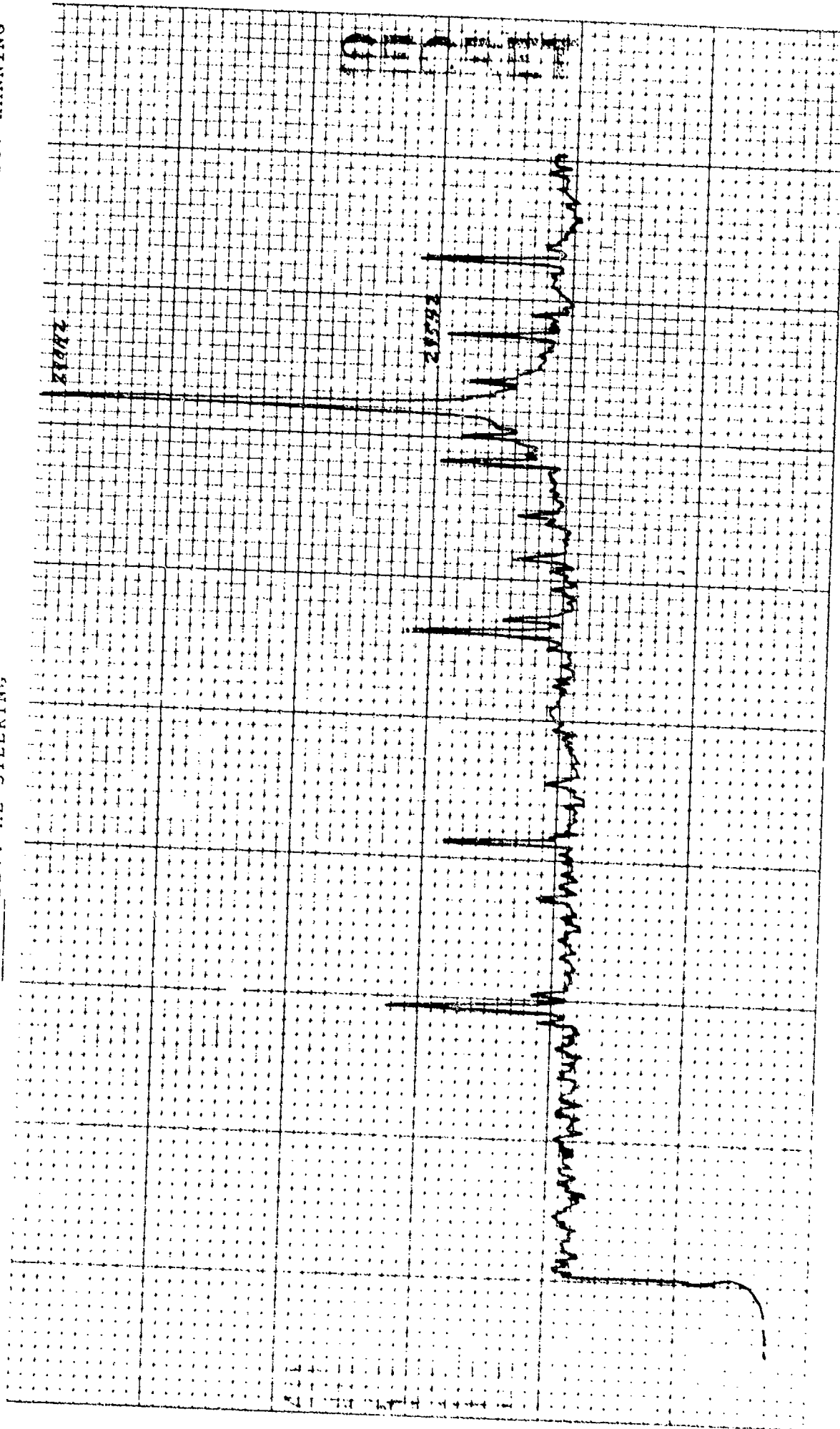
46 0703

REEL: 436

INDE X 3620

INTEGRATION TIME 320 SECS      ATTN:-12 DB  
                                FILTFR         WTC: HANNING

ATTN: 12-DB  
WTG: HANNING



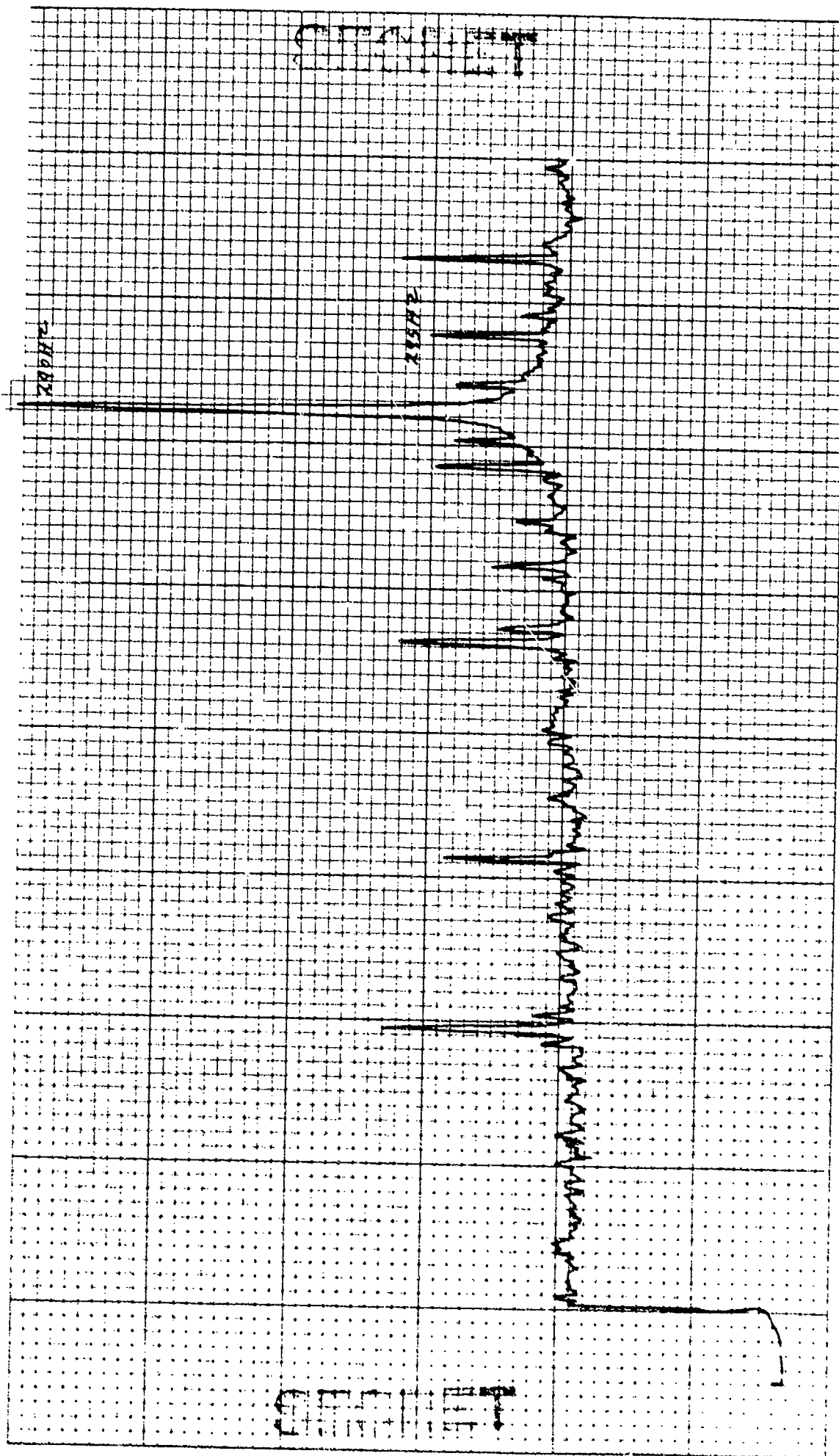
K<sub>0</sub>E 19 X 19 TO THE INCH • 7 X 19 INCHES  
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DP9)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16 )  
DATE/TIME: 3-25-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 50 DEG. AZ STEERING

REEL: 410 INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: 72 DB  
FILTER WTC: HANNING



KOE 10 X 10 TO THE INCH 0.7 / 10 INCHES  
REUTEL & ESSER CO. MADE IN USA

46 0703

CONTROL: 2131 - 16 (DP9)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

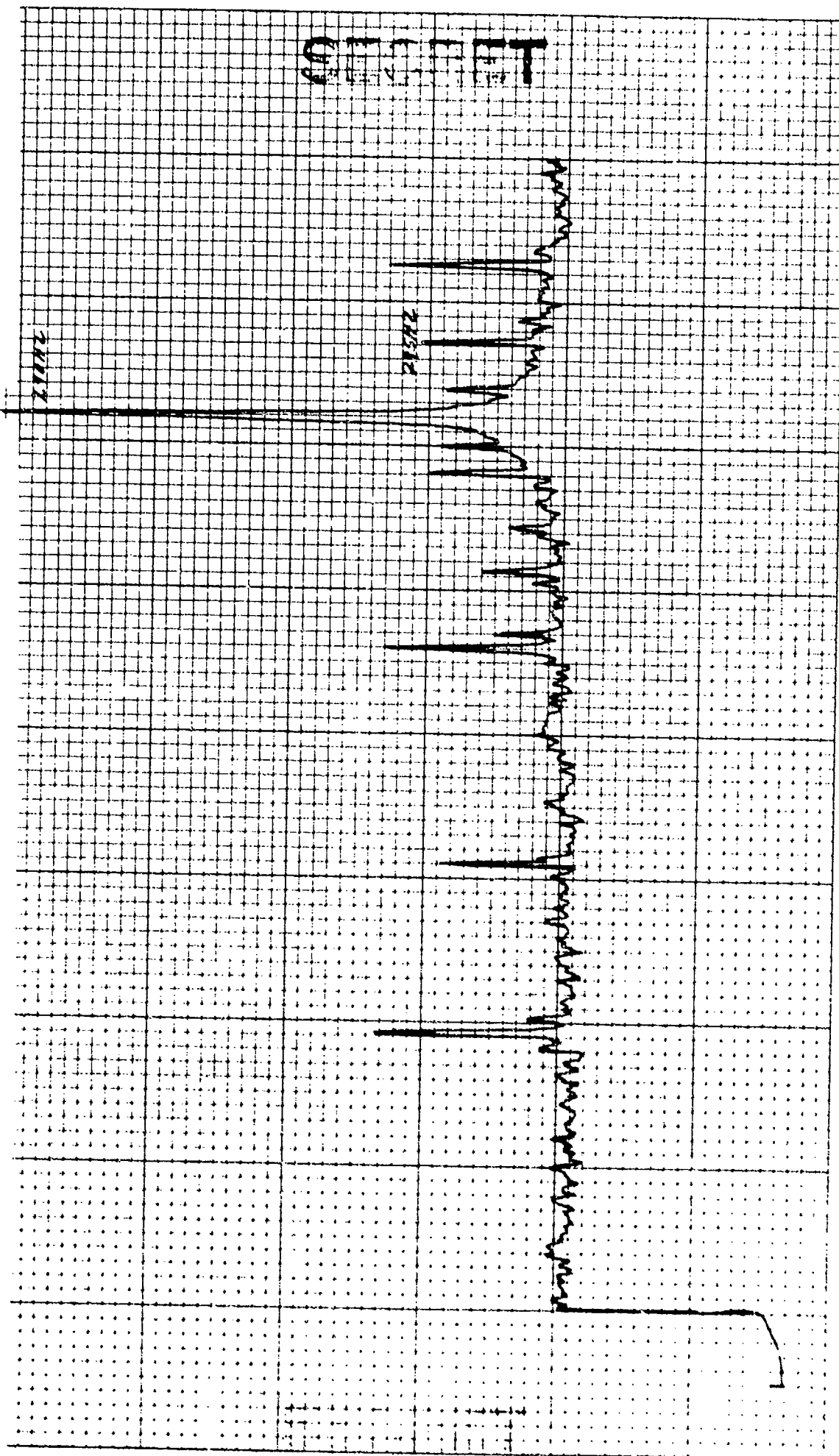
DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-15-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 50.5 DEG. AZ STEERING

REEL: 410

INDE XJ620

INTEGRATION TIME 320 SECS  
FILTER

ATTEN: -12 DB  
WTG: HANNING



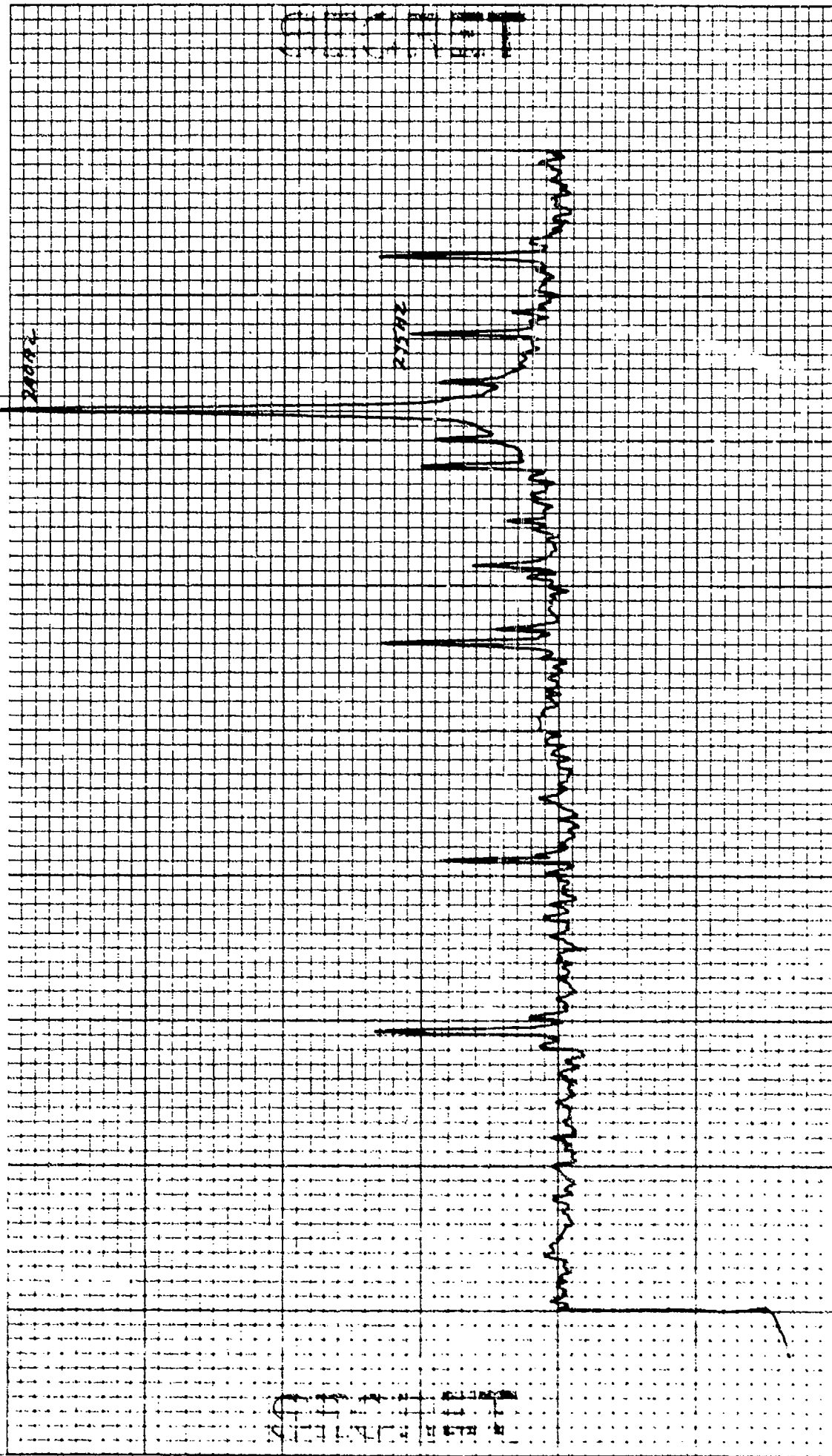
KOE 10 X 10 TO THE INCH 7 X 10 INCHES  
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DP9) DATE OF ANALYSIS: 1-16 )  
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z  
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ  
CENTER FREQ: 270 HZ + 51 DEG. AZ STEERING  
/6 ELEMENTS

REEL: 410 INDE X3620

INTEGRATION TIME 320 SECS ATTEN: -72 DB  
FILTER WTC: HANNING



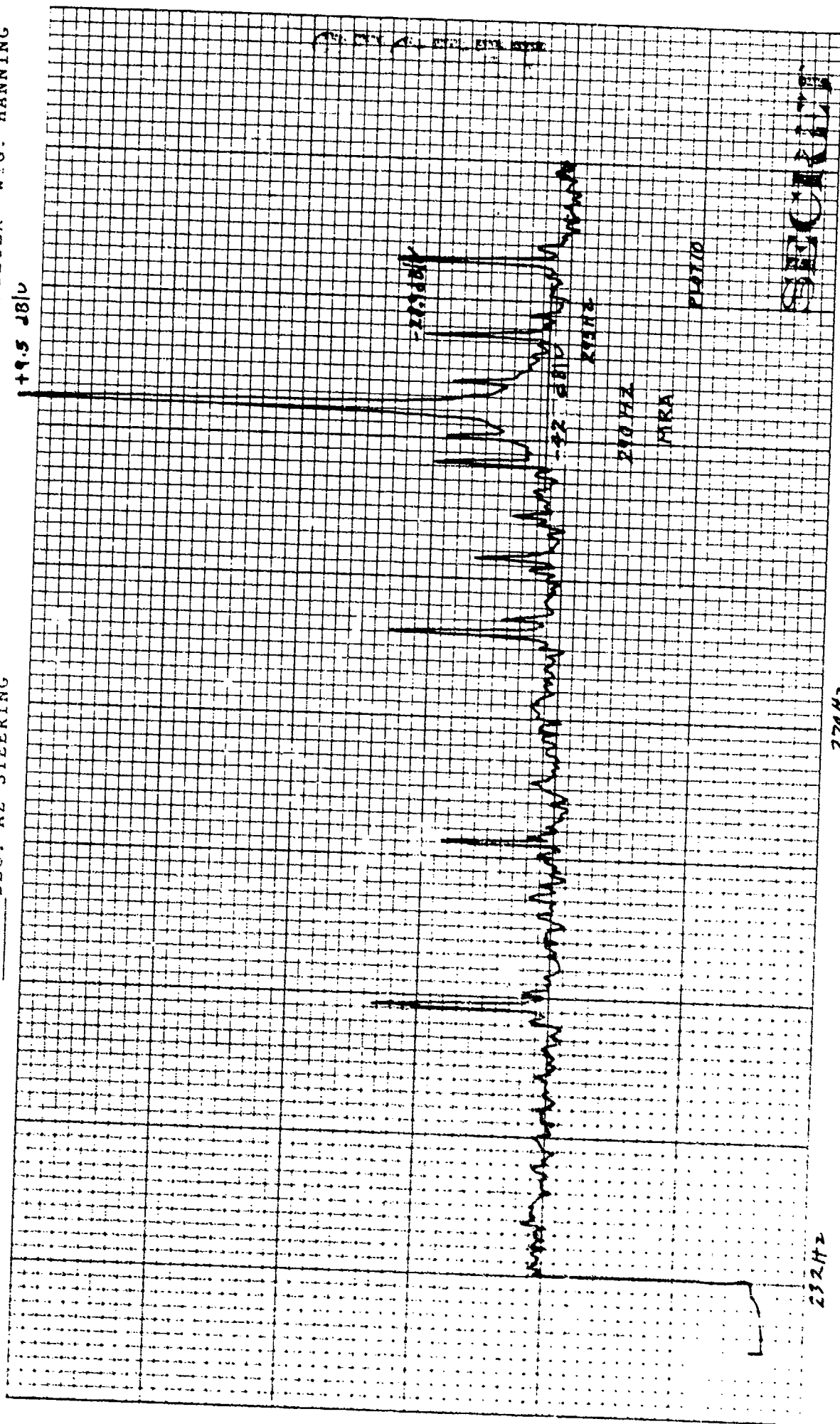
46 0703

# NOTES

CONTROL: 2131 - 51 (259)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: / 20 16 )  
DATE/TIME: 3-15-77 - 2151 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+51.5 DEG. AZ STEERING

INTEGRATION TIME 320 SECS  
REEL: M10  
ATTN: - DB  
WTG: HANNING  
INDEX XJ620



0174  
5  
4  
3  
2  
1  
0

27042

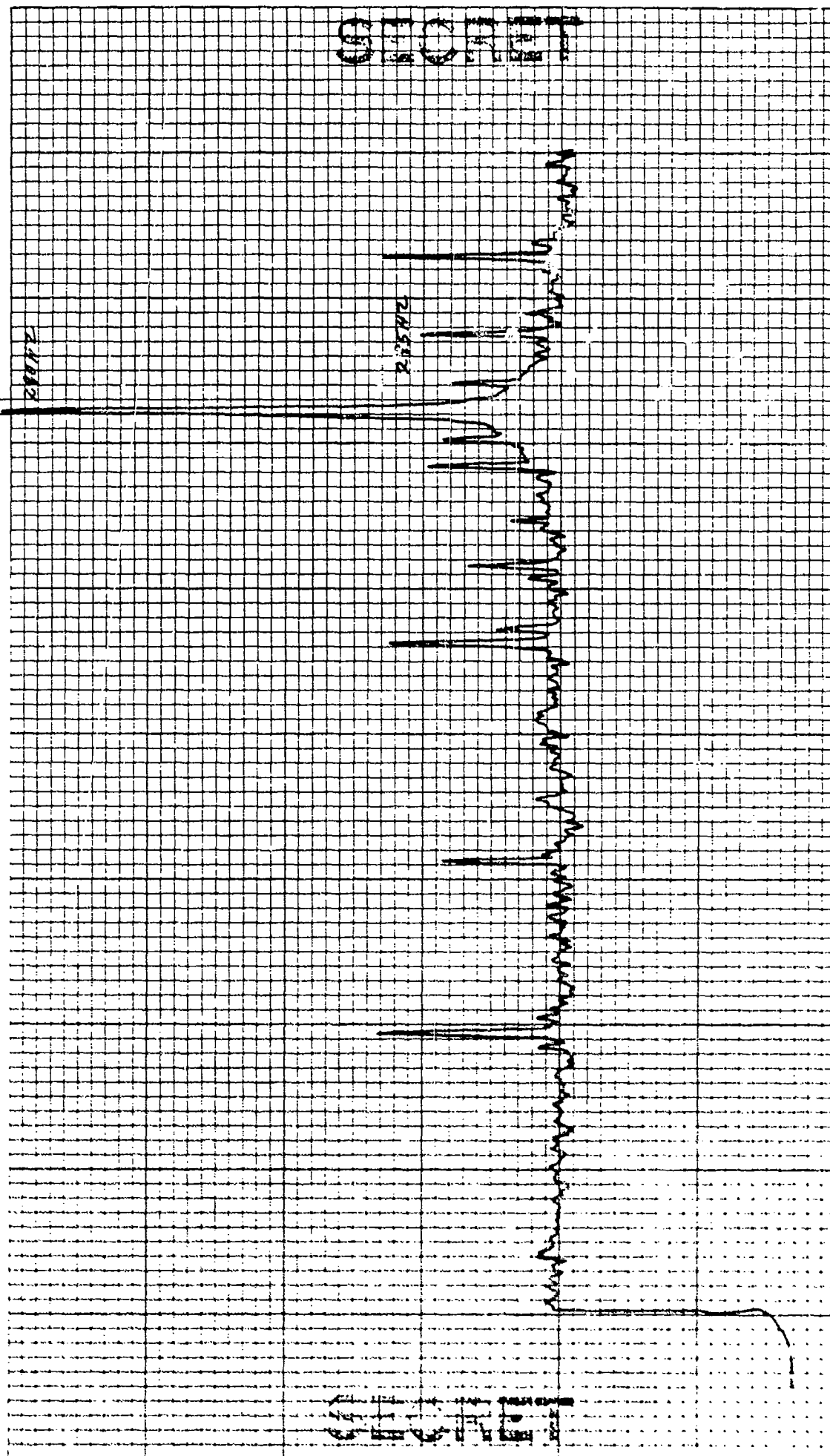
TABLE 3



K.E 10 X 10 TO THE INCH • 7 X 10 INCHES  
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-16 REEL: 110 INDEX: X 3620  
BEAMFORMED SPECTRUM (ELEMENTS) 1-16  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: -72 DB  
16 ELEMENTS +52 DEG. AZ STEERING FILTER WTG: HANNING



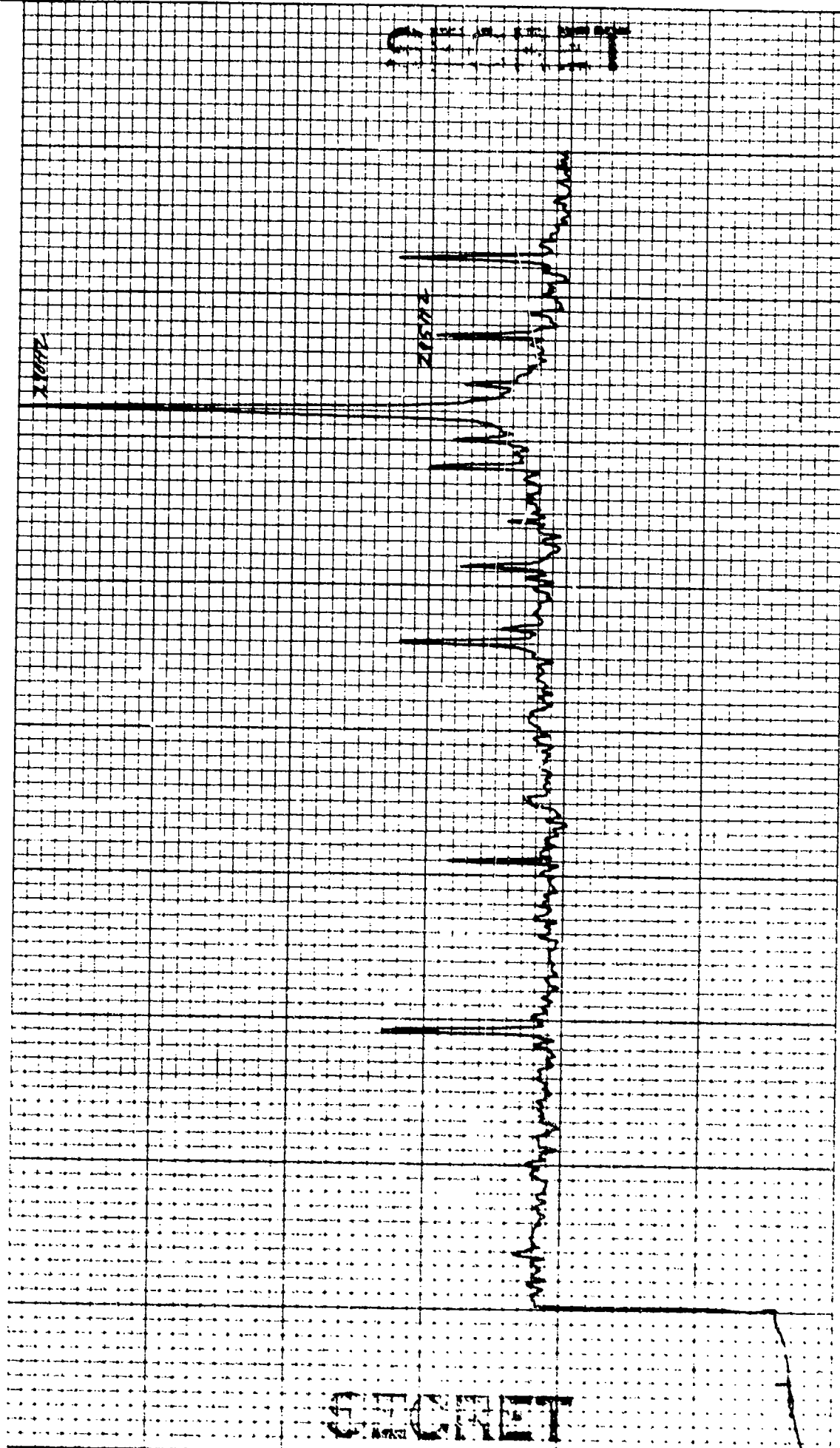
46 0703

CONTROL: 2/31 - 16 (289)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16 )  
DATE/TIME: 345-77 - 2/31 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+54 DEG. AZ STEERING

REEL: 110  
INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: 12 DB  
FILTER WTG: HANNING





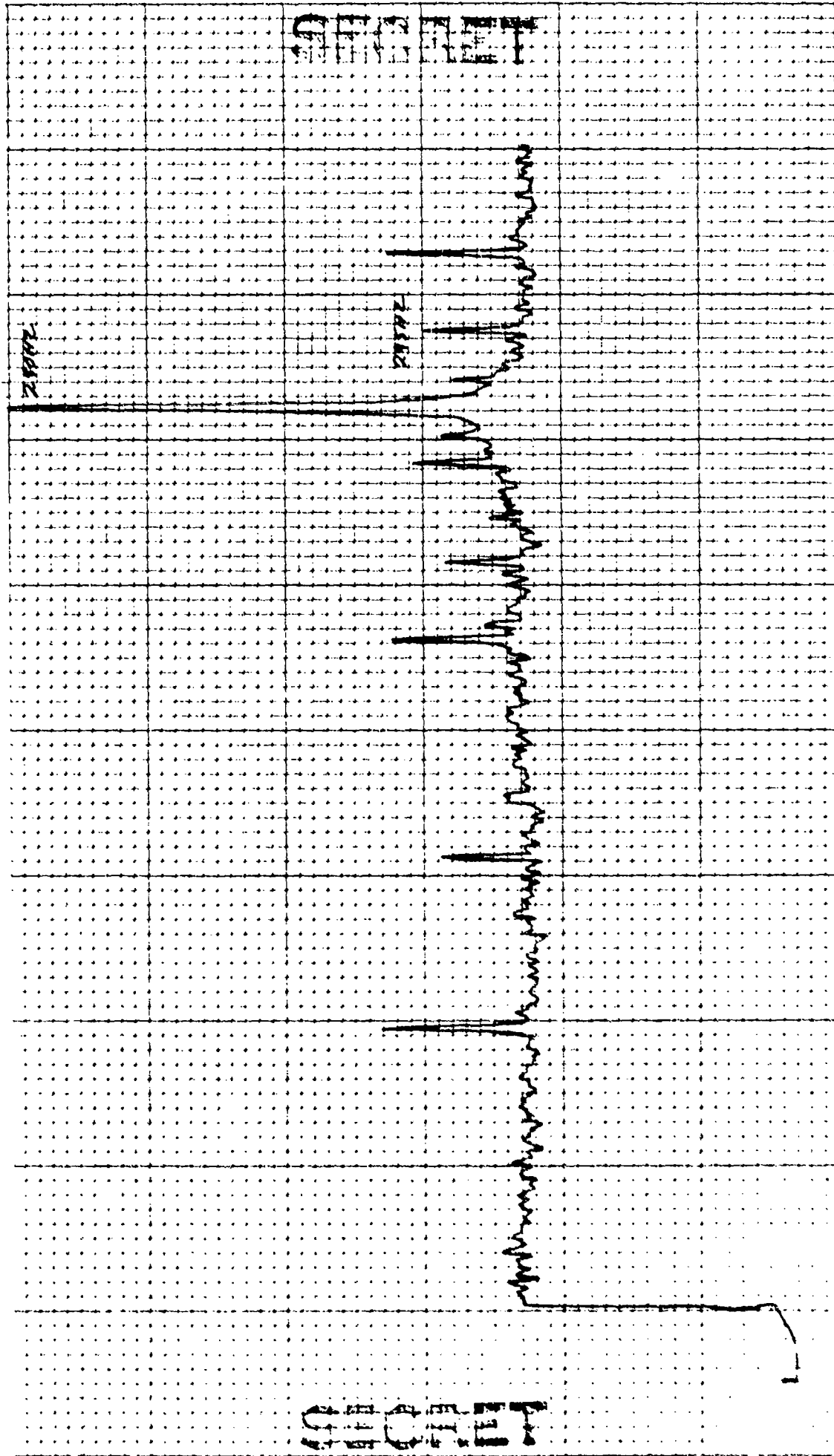
KOE 12/10 TO THE DIRECTOR, JCS

46 0703

CONTROL: 2131 - 16 (DPT)  
BEAMFORMED SPECTRUM ELEMENTS  
EXERCISE: BEARING STAFF  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 346-77-0131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+56 DEG. AZ STEERING

REEL: 410 INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER WTC: HANNING



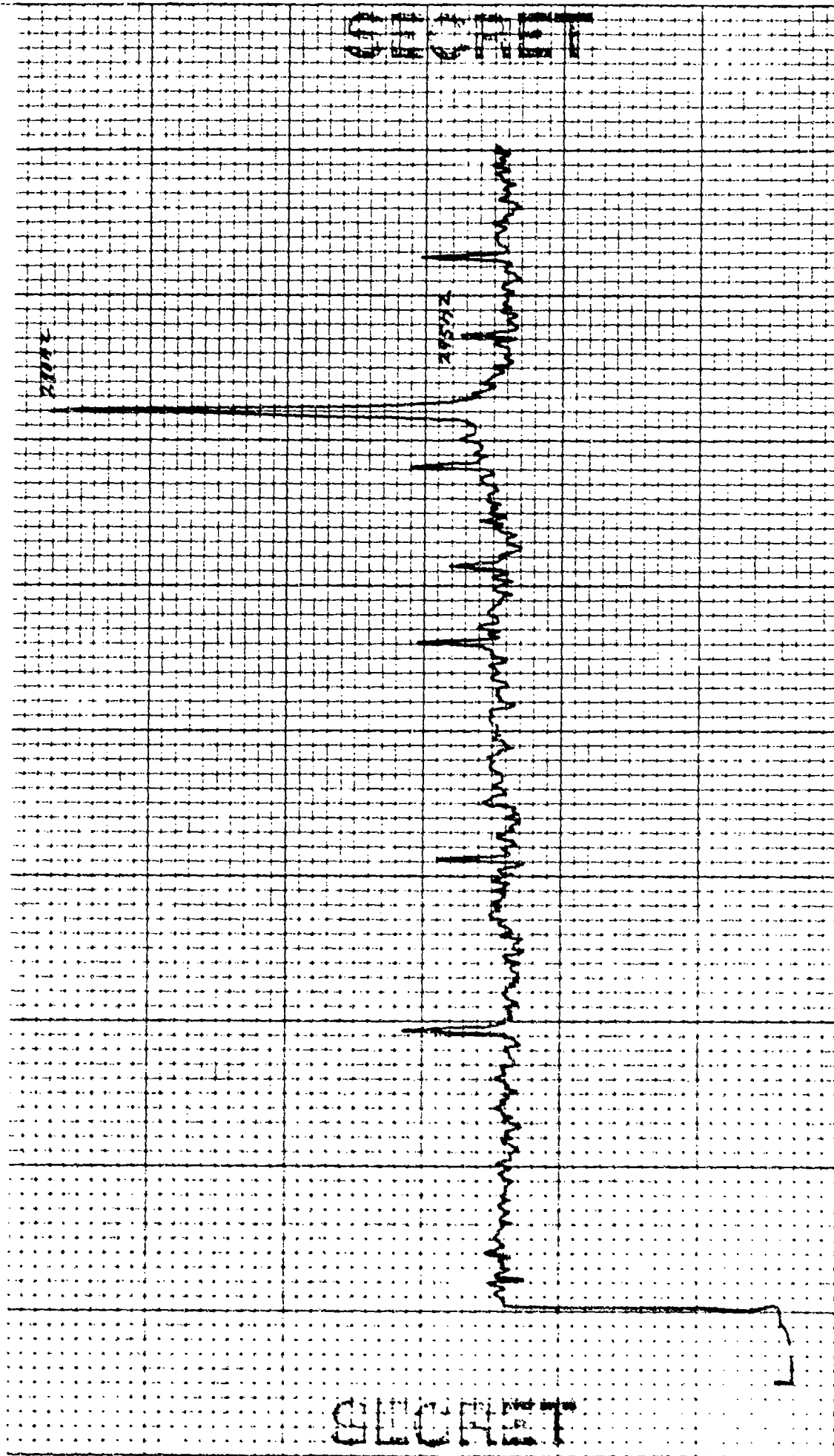
KOE 10.2 IS TO THE INCHES 2.5 INCHES  
1/4 INCH 1/4 INCH 1/4 INCH

46 0703

CONTROL: 2031 - 16 (DP1)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-8-77 - 0131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+50 DEG. AZ STEERING

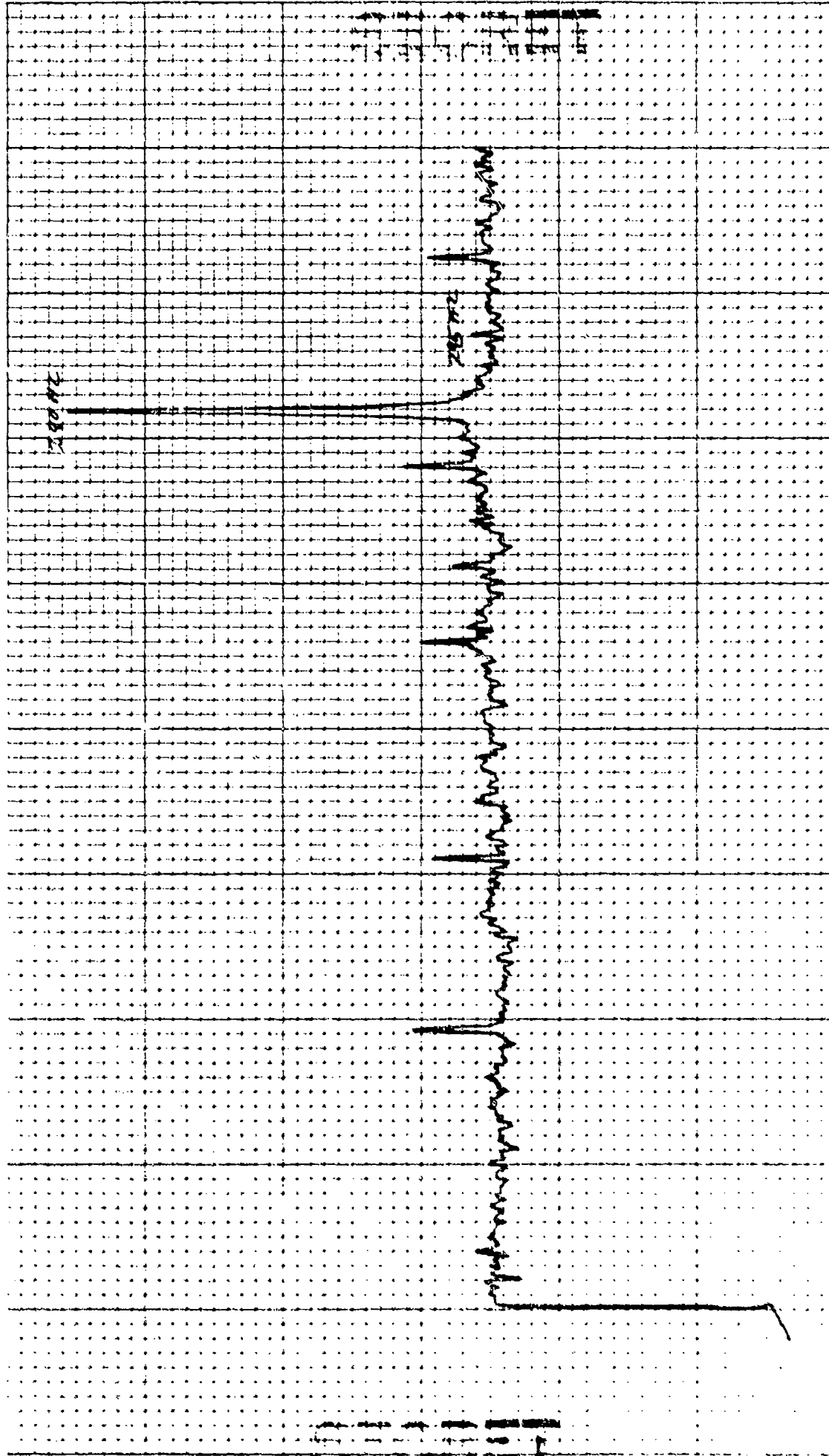
REEL: M10 INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: 12 DB  
FILTER WTG: HANNING



KSE 10.5 TO 10.5 MHz (10.5 MHz)

46 0703

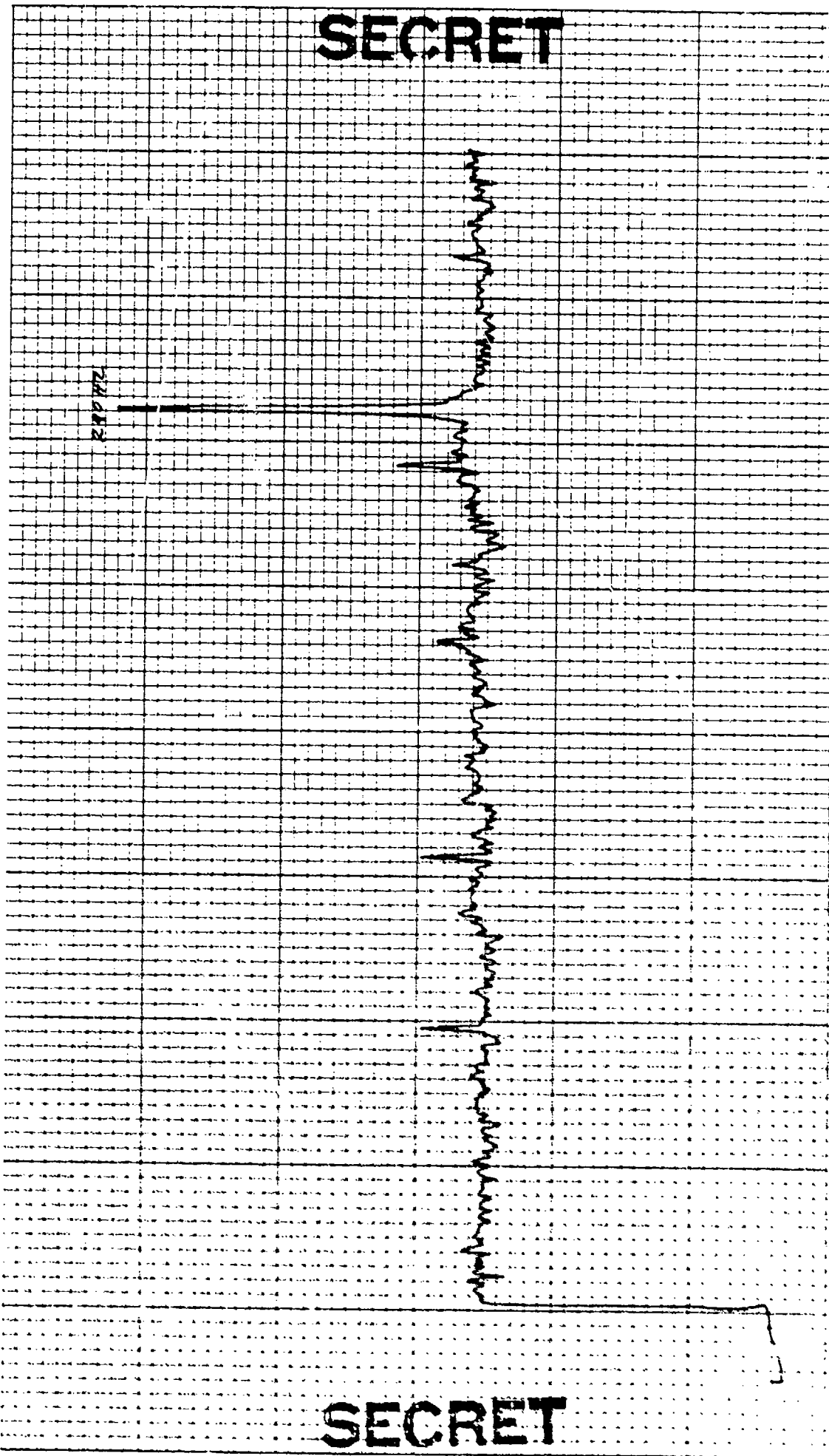
CONTROL: 2001 - 16 (DP9)  
REAMPOMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 290 HZ  
16 ELEMENTS  
DATE OF ANALYSIS: 1-16  
DATE/TIME: 0-57 - 203/2  
ANALYSIS BANDWIDTH: 1/10HZ  
+60 DEG. AZ STEERING  
REEL: 110  
INDE X3020  
INTEGRATION TIME 320 SECS  
ATTEN: 7.5 DB  
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH 7 X 10 INCHES  
REUTEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2031 - 16 (DPG)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS  
DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-15-77 - 3/31 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+62 DEG. AZ STEERING  
REEL: 410  
INDE X3620  
INTEGRATION TIME 320 SECS  
ATTEN: 72 DB  
FILTER  
WTG: HANNING



140E 10.8 IN TO THE UNCHAINED 10.8 INCHES  
RECEIVED AT THE CO. 10.8 INCHES

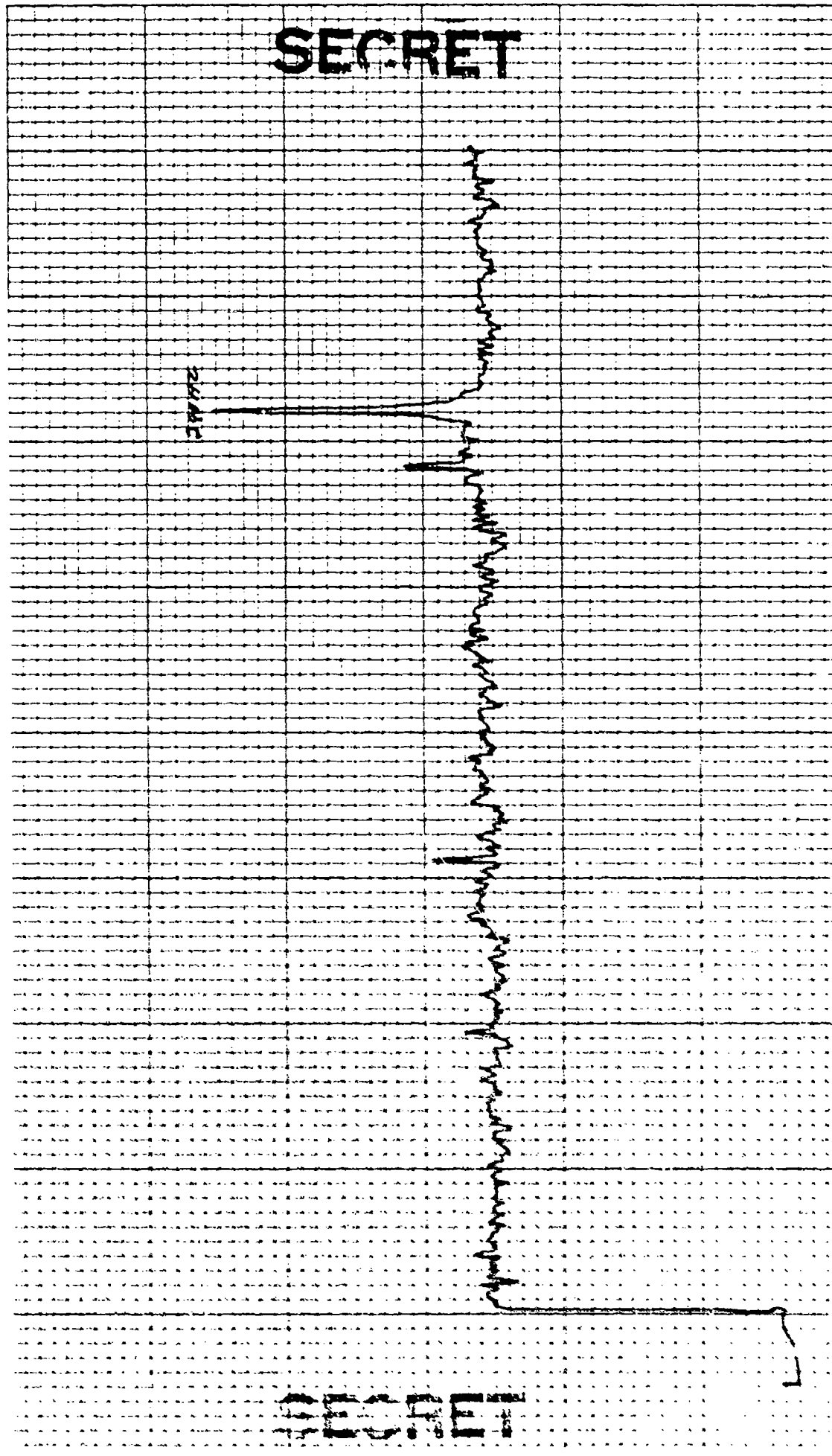
46 0703

CONTROL: 2431 - 16 (DP1)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
/6 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 7-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
464 DEG. AZ STEERING

REEL: 110  
INDE X362c

INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
WTG: HANNING  
FILTER



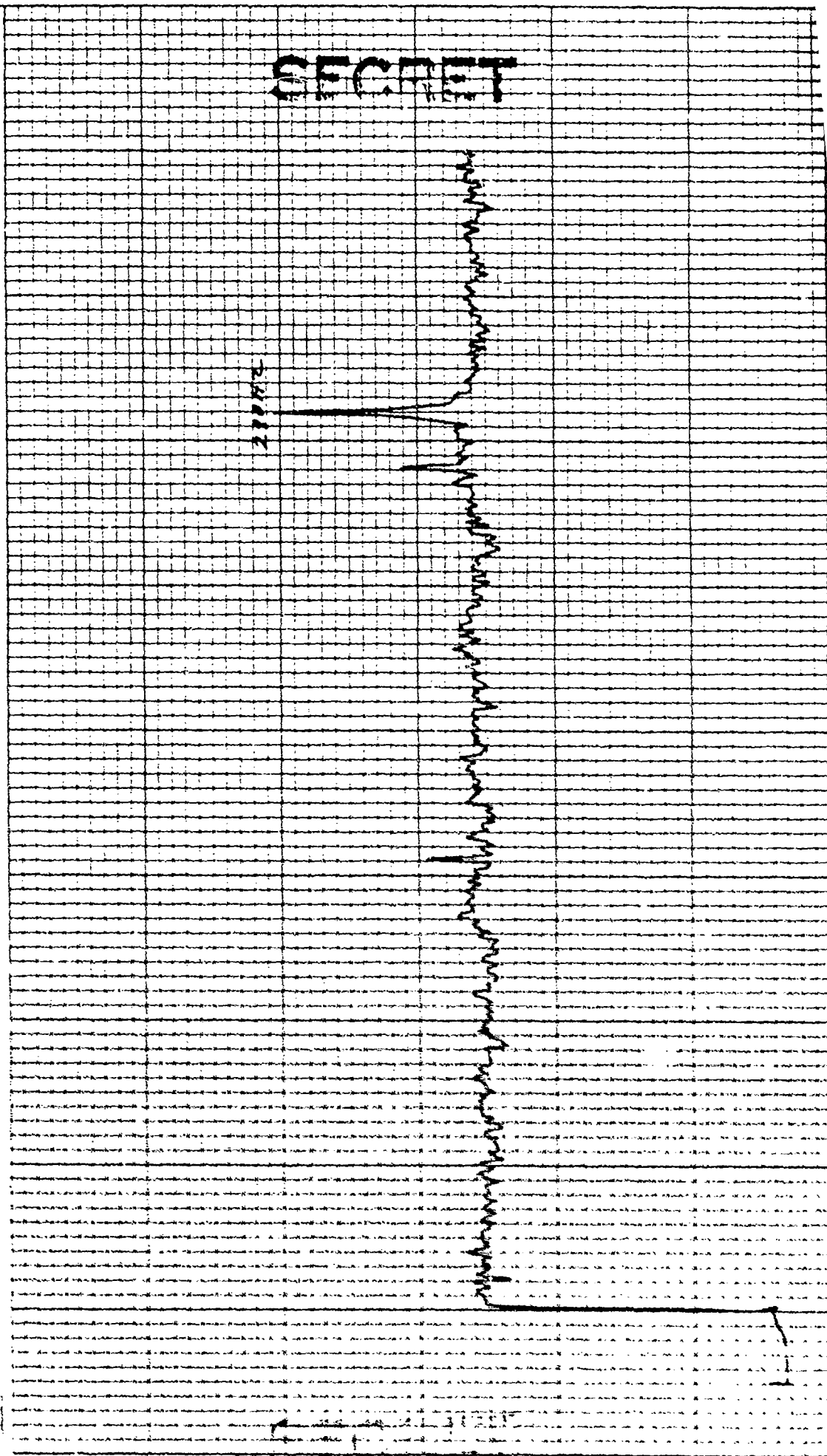
16E 10 X 10 TO 100 INCHES 1 X 10 INCHES  
HALLUPPEL M. E. G. CO. MADE IN U.S.A.

46 0703

CONTROL: 2031 - 16 (200)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 05-27-2013/ 7  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 22 DEG. AZ STEERING

REEL: 410  
INTEGRATION TIME 320 SECS  
FILTER  
WTG: HANNING  
INDE X3620

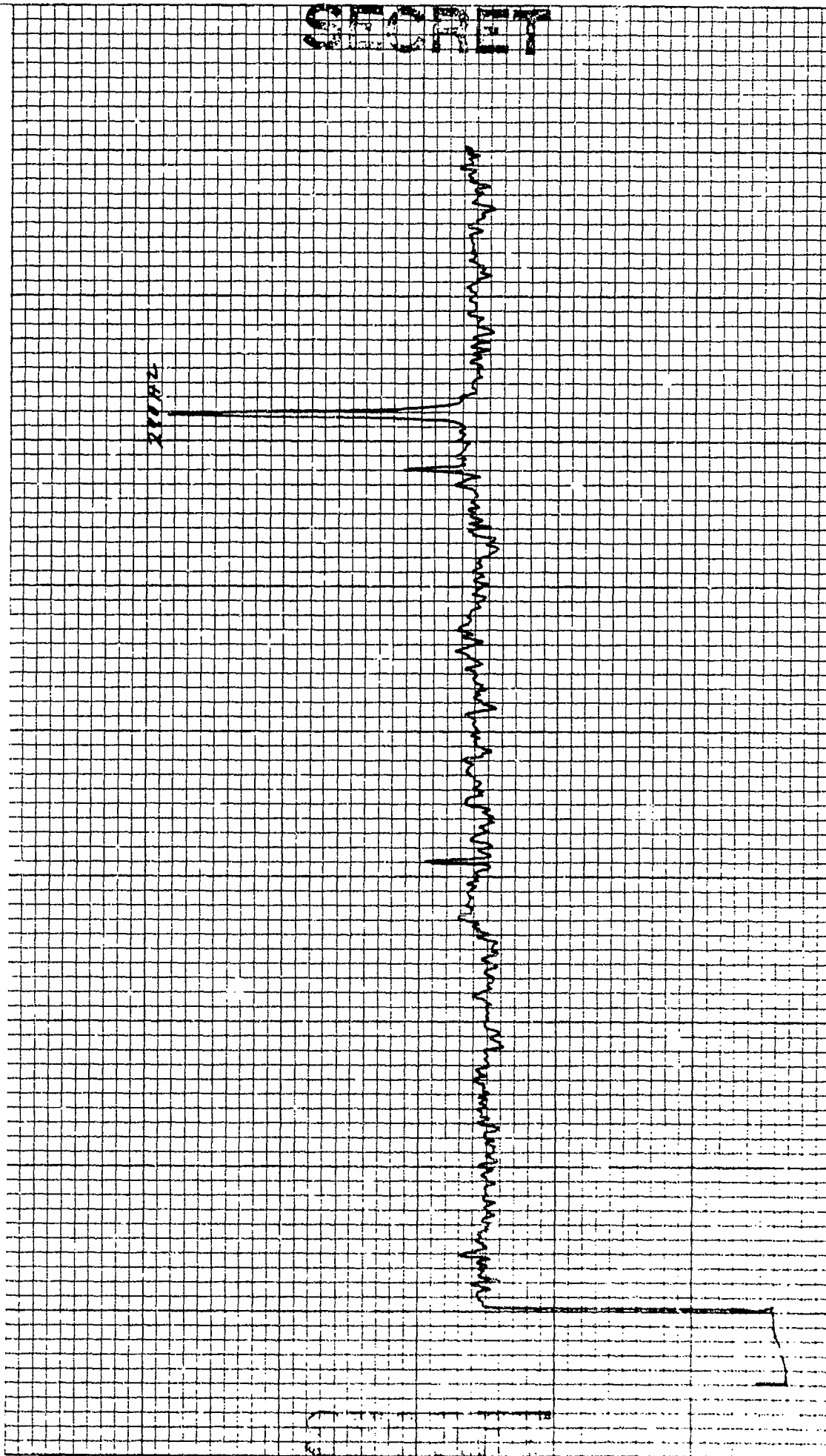


CONTROL: 2/31-16 (DP9)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+68 DEG. AZ STEERING

REEL: M10 INDE X3690

INTEGRATION TIME 320 SECS  
ATTEN: -12 DB  
FILTER  
WTG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

|                                |              |                                      |
|--------------------------------|--------------|--------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-21.9</u> |                                      |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -11.9                                |
| BEAMFORMER GAIN                | <u>+24</u>   | +12.1 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .2</u>  | +12.3 SIG. LEVEL FOR SIGNAL GAIN     |

SECTION 12

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-64.5</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -54.5                                 |
| BEAMFORMER GAIN                | <u>+24</u>   | -30.5 NOISE LEVEL FOR SNR CALCULATION |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>+12.1</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-30.5</u> | +2.6                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | 38.6                  |
| MRA CORRECTION       | <u>+ .2</u>  | 38.8 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-8.2</u>  | 30.6 SNR 1 HZ BAND    |

CONFIDENTIAL



**CONFIDENTIAL**

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

|                                |              |                                      |
|--------------------------------|--------------|--------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-14.2</u> |                                      |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | - 4.2                                |
| BEAMFORMER GAIN                | <u>+24</u>   | +19.9 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .6</u>  | +20.5 SIG. LEVEL FOR SIGNAL GAIN     |

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-67.1</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -57.1                                 |
| BEAMFORMER GAIN                | <u>+24</u>   | -33.1 NOISE LEVEL FOR SNR CALCULATION |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>+19.9</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-33.1</u> | 53.0                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | +49.0                 |
| MRA CORRECTION       | <u>+ .6</u>  | 49.6 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-8.2</u>  | 41.4 SNR 1 HZ BAND    |

**CONFIDENTIAL**

# CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

## SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -52.7

MCPS-32 CAL. CORRECTION +10 -42.7

BEAMFORMER GAIN +24 -18.7 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .9 -17.8 SIG. LEVEL FOR SIGNAL GAIN

## NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -67.2

MCPS-32 CAL. CORRECTION +10 -57.2

BEAMFORMER GAIN +24 -33.2 NOISE LEVEL FOR SNR CALCULATION

## SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -18.7

SIGNAL LEVEL FOR SNR -33.2 14.5

PROCESSOR CORRECTION -4.0 10.5

MRA CORRECTION + .9 11.4 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION -8.2 3.2 SNR 1 HZ BAND

~~CONFIDENTIAL~~

DATA POINT 9

SIGNAL GAIN

|                        | <u>140 HZ</u> | <u>290HZ</u> | <u>295HZ</u> |
|------------------------|---------------|--------------|--------------|
| MEAN OMNI SIGNAL LEVEL | <u>-19.4</u>  | <u>-17.5</u> | <u>N.D.</u>  |
| MRA SIGNAL LEVEL       | <u>+12.3</u>  | <u>+20.4</u> | <u>-17.8</u> |
| ARRAY SIGNAL GAIN      | <u>31.7</u>   | <u>30.9</u>  |              |
| 20 LOG <u>32</u>       | <u>30.1</u>   | <u>30.1</u>  | <u>30.1</u>  |
| # of elements          |               |              |              |
| DIFFERENCE             | <u>+1.6</u>   | <u>+2.8</u>  |              |

ARRAY GAIN

|                                      |             |             |             |
|--------------------------------------|-------------|-------------|-------------|
| MRA SNR                              | <u>38.8</u> | <u>49.6</u> | <u>11.4</u> |
| MEAN OMNI SNR                        | <u>28.6</u> | <u>34.5</u> | <u>N.D.</u> |
| ARRAY GAIN                           | <u>10.2</u> | <u>15.1</u> |             |
| THEORETICAL BEAMUTH GAIN<br>(at MRA) | <u>11.7</u> | <u>14.2</u> | <u>14.0</u> |
| DIFFERENCE                           | <u>-1.5</u> | <u>+ .9</u> |             |

1947

REEL: 110

ATTN: -24DB  
WTG: HANNING

INTEGRATION TIME 320 SECS  
FILTER

DATE OF ANALYSIS: 1-26-34

DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ

+44 DEG. AZ STEERING

CONTROL: 2131 - 22 (DPI)  
BEAMFORMED SPECTRUM (ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

**SECRET**

**SECRET**

46 0703

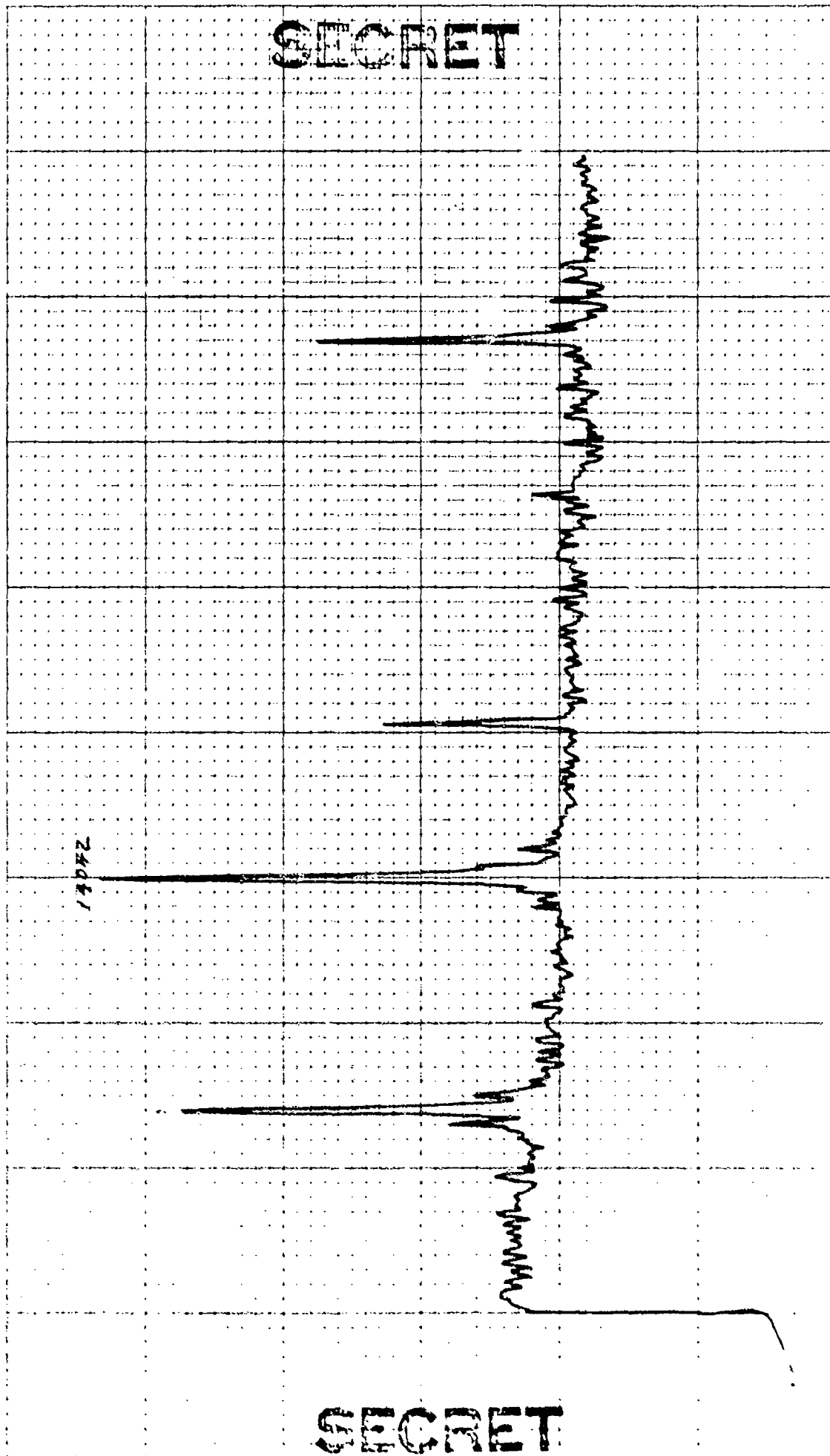
1-26 8 29-34

CONTROL: 2131 - 32 (DP9)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26 8 29-34  
DATE/TIME: 3-5-77-2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 46 DEG. AZ STEERING

REEL: 410  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -2YDB  
WTG: HANNING

INDE XJ62c



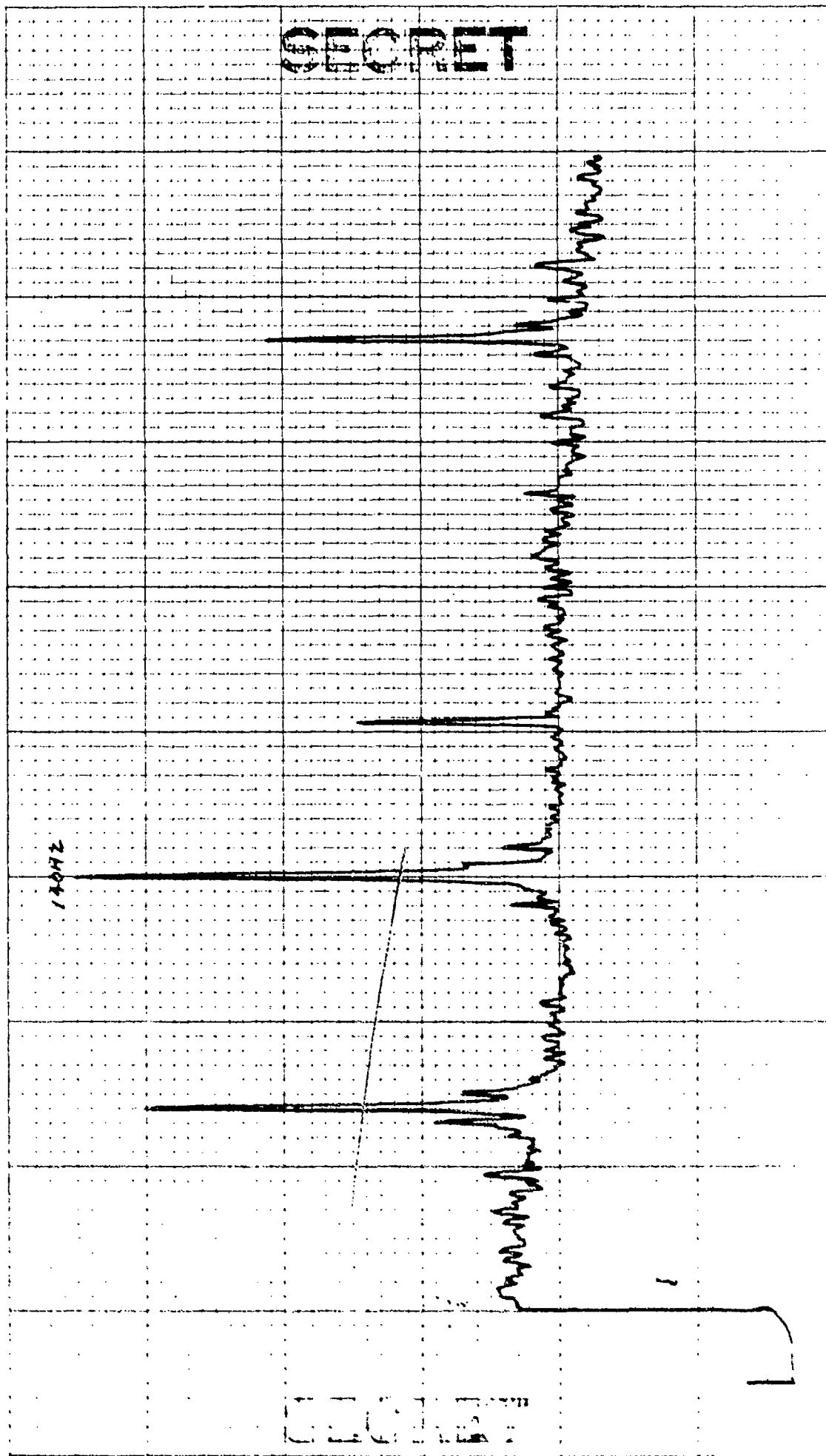
NOTE: 10/10 TO THE RIGHT OF THE PAGE

46 0703

CONTROL: 2131 - 32 (009)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - - -  
/ - 26 009 - 34 )  
DATE/TIME: 175-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+48 DEG. AZ STEERING

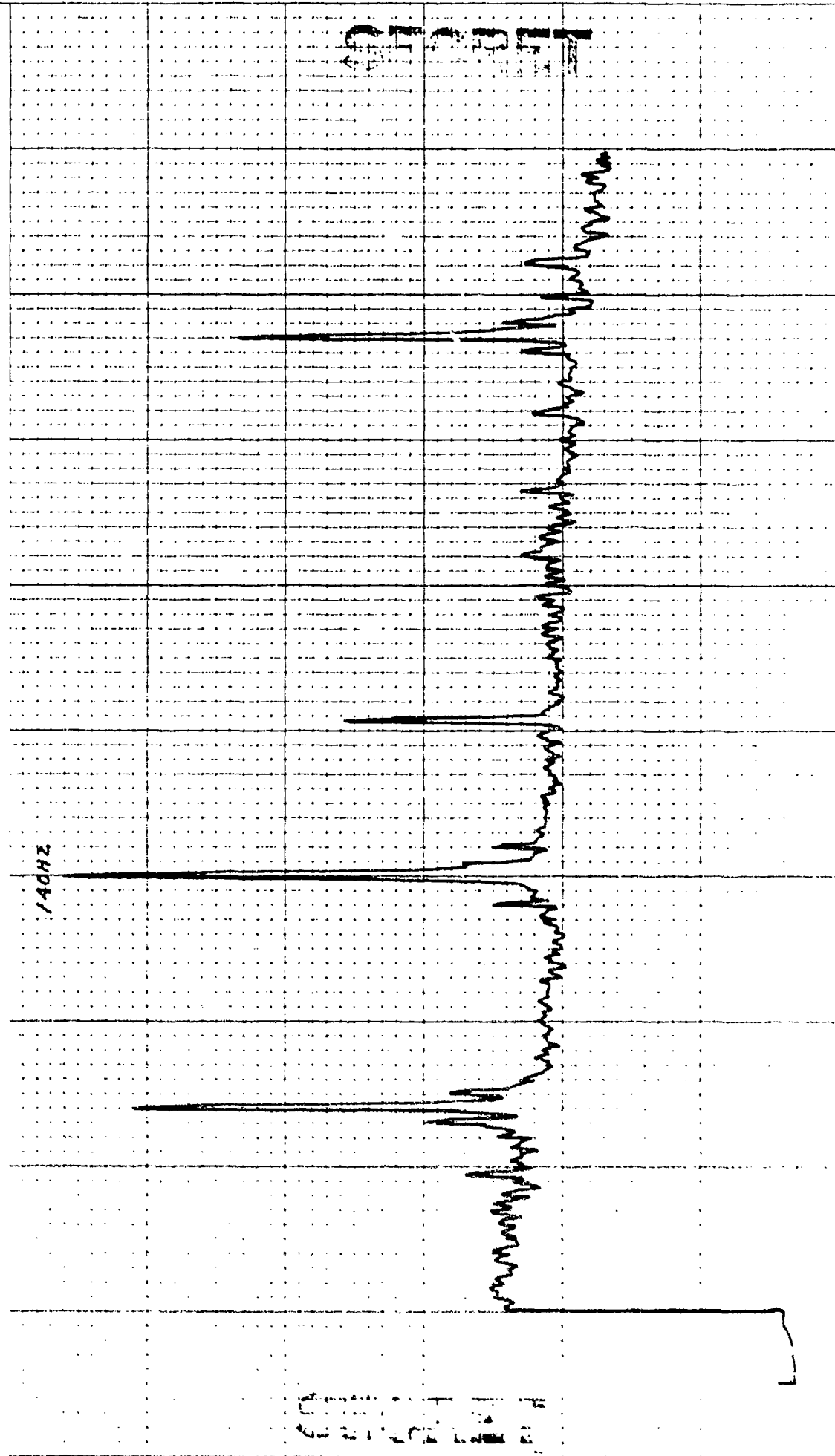
REE.: ALC INDE X2620  
INTEGRATION TIME 320 SECS  
ATTEN: -2Y DB  
FILTER WTG: HANNING



1-26-77 10:40 TO TIME 10:41:00

46 0703

CONTROL: 2/31 - 32 (DPF) REEL: 410 INDE X3620  
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-77 10:40-34  
EXERCISE: BEARING STAKE DATE/TIME: 2-15-77 - 2/13/2  
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS +50 DEG. AZ STEERING FILTER WTG: HANNING ATTN: -2Y DB



46 0703

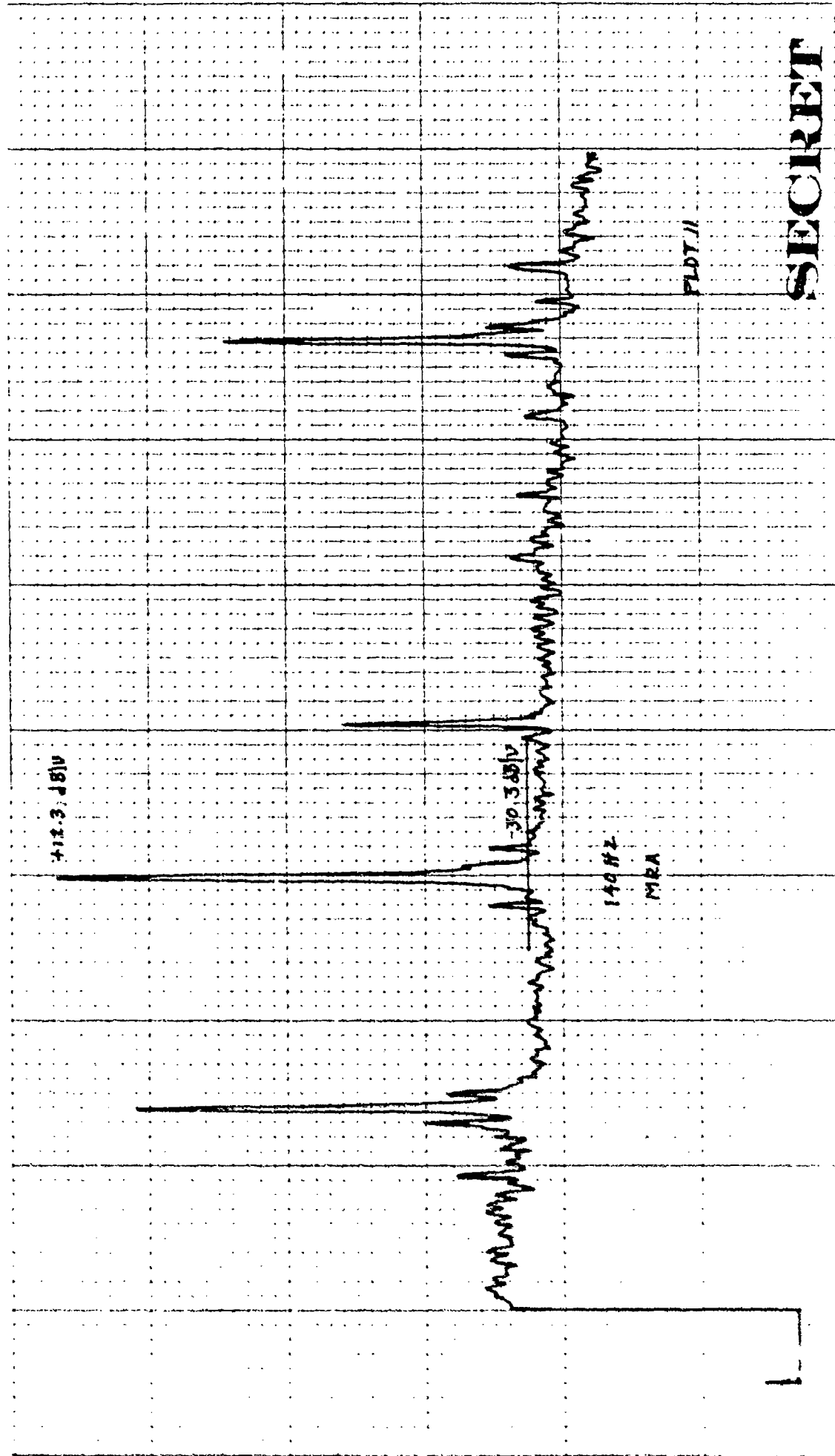
**SECRET**

CONTROL: 2131 - 51 (009)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 17.26 2070 34  
 DATE/TIME: 3-15-77 - 2131 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 +51.5 DEG. AZ STEERING

REEL: 710  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE XJ620



**SECRET**

150 HZ

100 HZ

2111



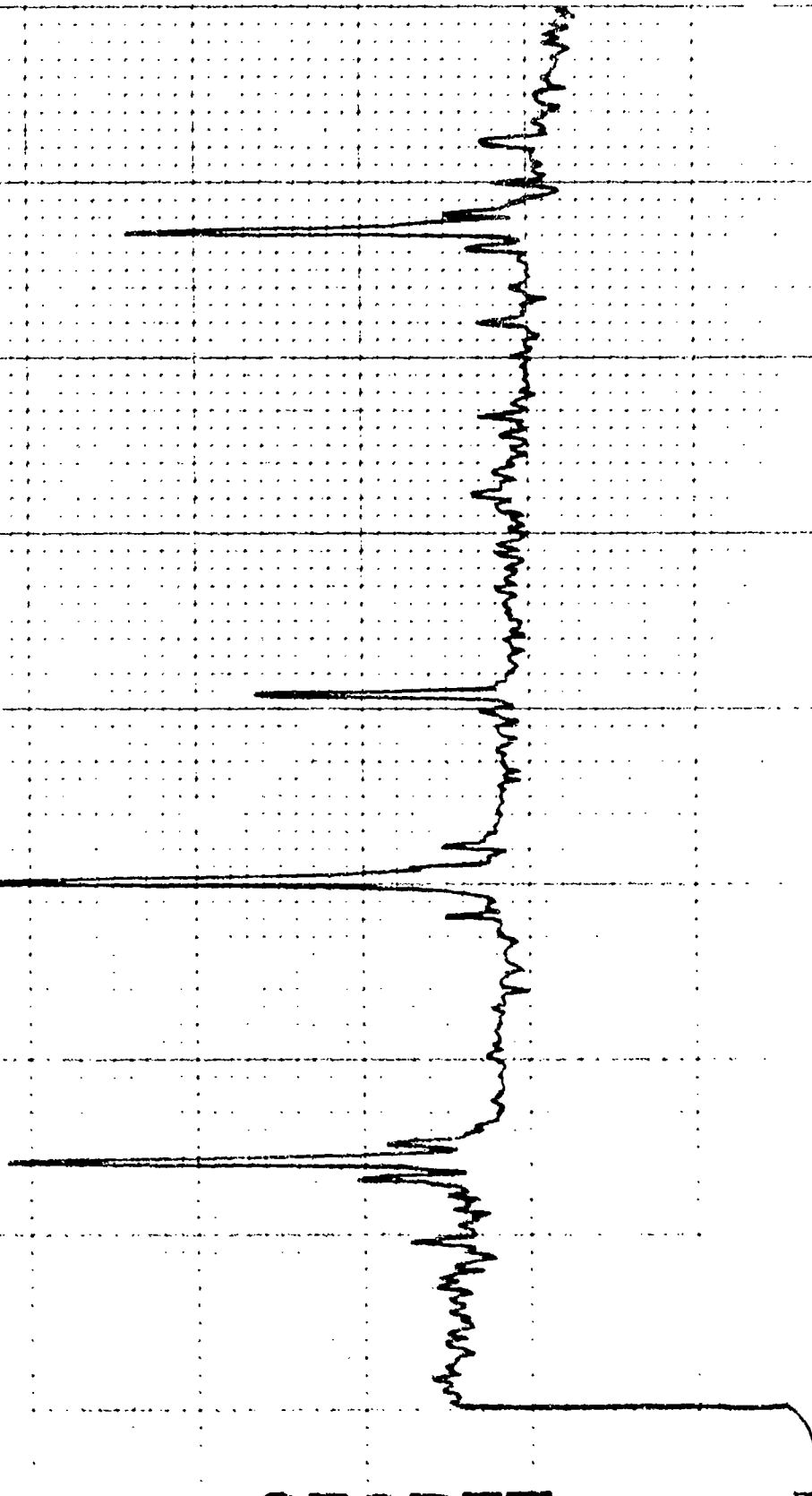
46 0703

CONTROL: 2131 -32 (DP9)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - -  
1-26 8 08 34  
DATE/TIME: 3-15-77 - 013/Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+51 DEG. AZ STEERING

REEL: 210  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -24 DB  
WTG: HANNING  
INDE X3626

140 HZ



SECRET

SECRET

46 0703

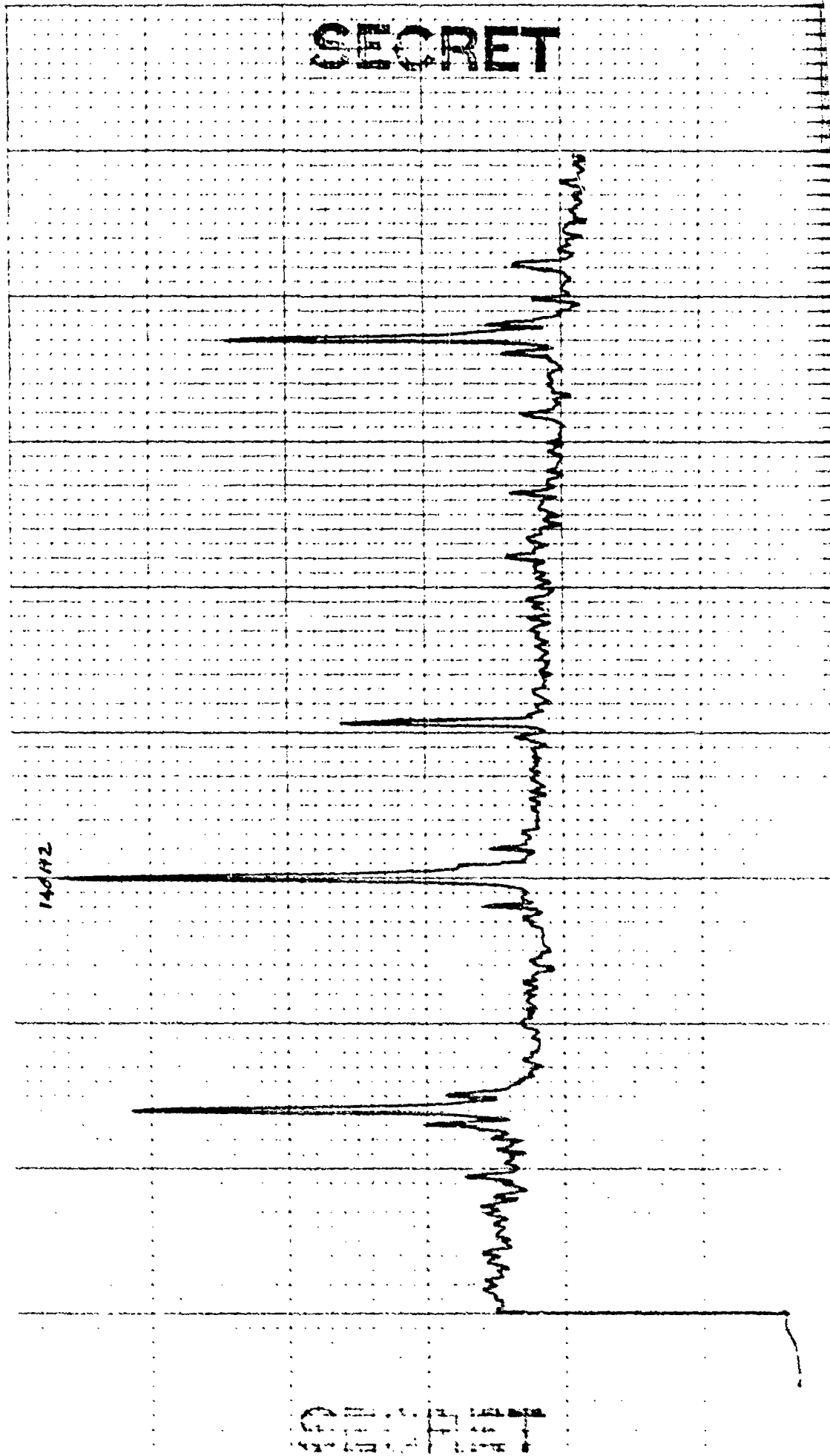
16-3 21-31 21-31 21-31 21-31

11

CONTROL: 2131 - 32 (209)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-88  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
452 DEG. AZ STEERING

REEL: 410  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -24 DB  
WTG: HANNING  
INDE XJ620

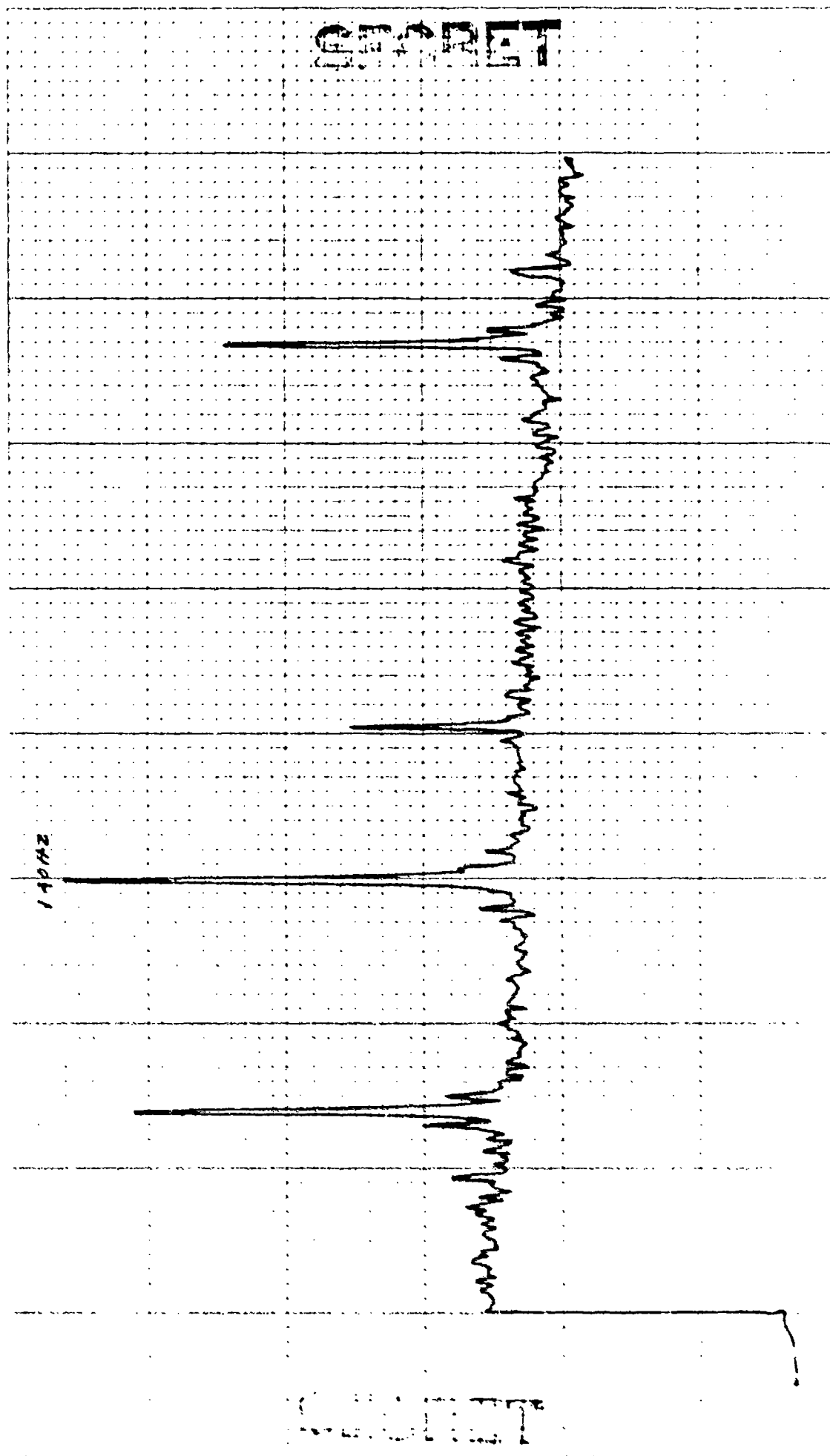


46 0703

CONTROL: 213/- 32 (289)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26 1200-34  
DATE/TIME: 3-5-77 - 2031 Z  
ANALYSIS BANDWIDTH: 11/10HZ  
+54 DEG. AZ STEERING

REEL: M10 INDE X3624  
INTEGRATION TIME 320 SECS  
ATTEN: 24 DB  
FILTER WTC: HANNING



1-26-77 08:00:00

46 0703

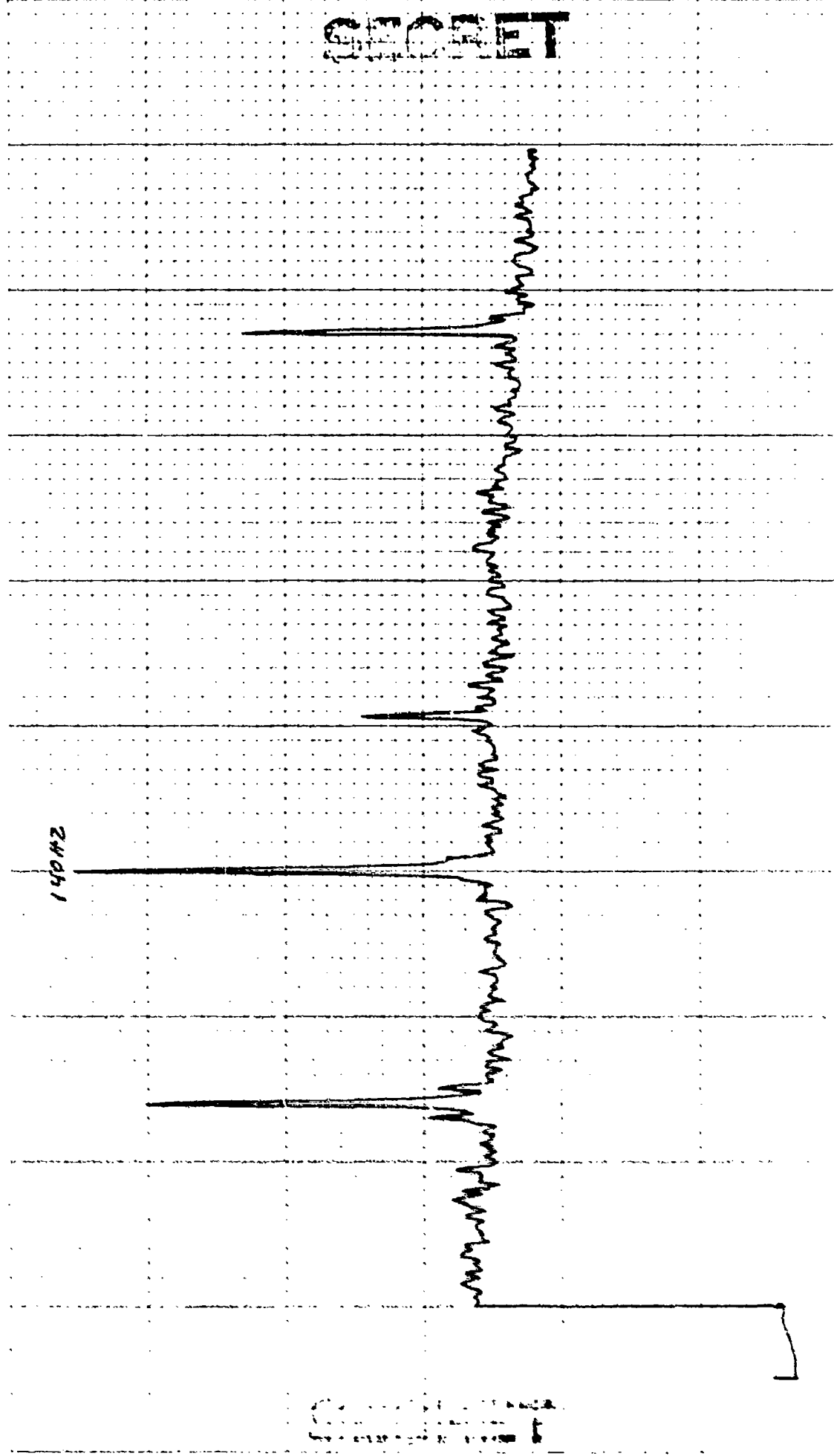
CONTROL: 2131 - 32 (DP1)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTF FREQ: 150 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 08:00:00  
DATE/TIME: 3-15-77 - 2131/2  
ANALYSIS BANDWIDTH: 1/10 HZ  
+56 DEG. AZ STEERING

REEL: A10  
INTEGRATION TIME 320 SECS  
FILTER

INDE X 3020

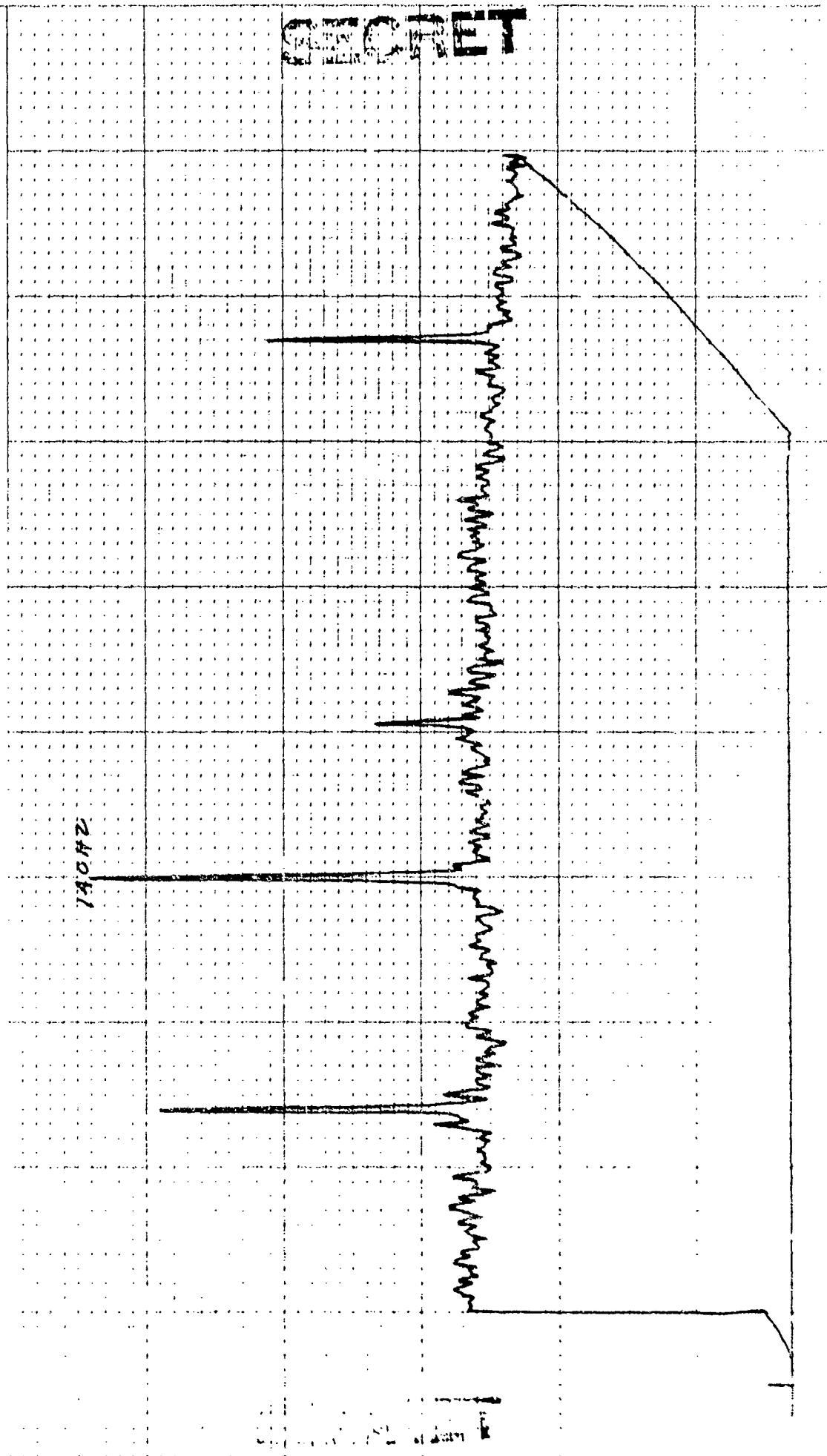
ATTEN: -20 DB  
WTG: HANNING



45 0703

1-26 1400Z 10/10/70

CONTROL: 2131 - 32 (349)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING TAKE  
CENTER FREQ: 250 HZ  
32-ELEMENTS  
DATE OF ANALYSIS: 1-26 1400Z  
DATE/TIME: 3-15-70 - 0131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+50 DEG. AZ STEERING  
REEL: A10  
INDE XJ620  
INTEGRATION TIME 320 SECS  
ATTEN: -24 DB  
FILTER WTG: HANNING



46 0703

CONTROL: 2131 - 72 (209)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 KZ  
72 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34  
DATE/TIME: 2-15-87-2131Z  
ANALYSIS BANDWIDTH: 1710HZ  
+60 DEG. AZ STEERING

REEL: M10  
INTEGRATION TIME 320 SECS  
ATTEN: -24DB  
FILTER WIG: HANNING

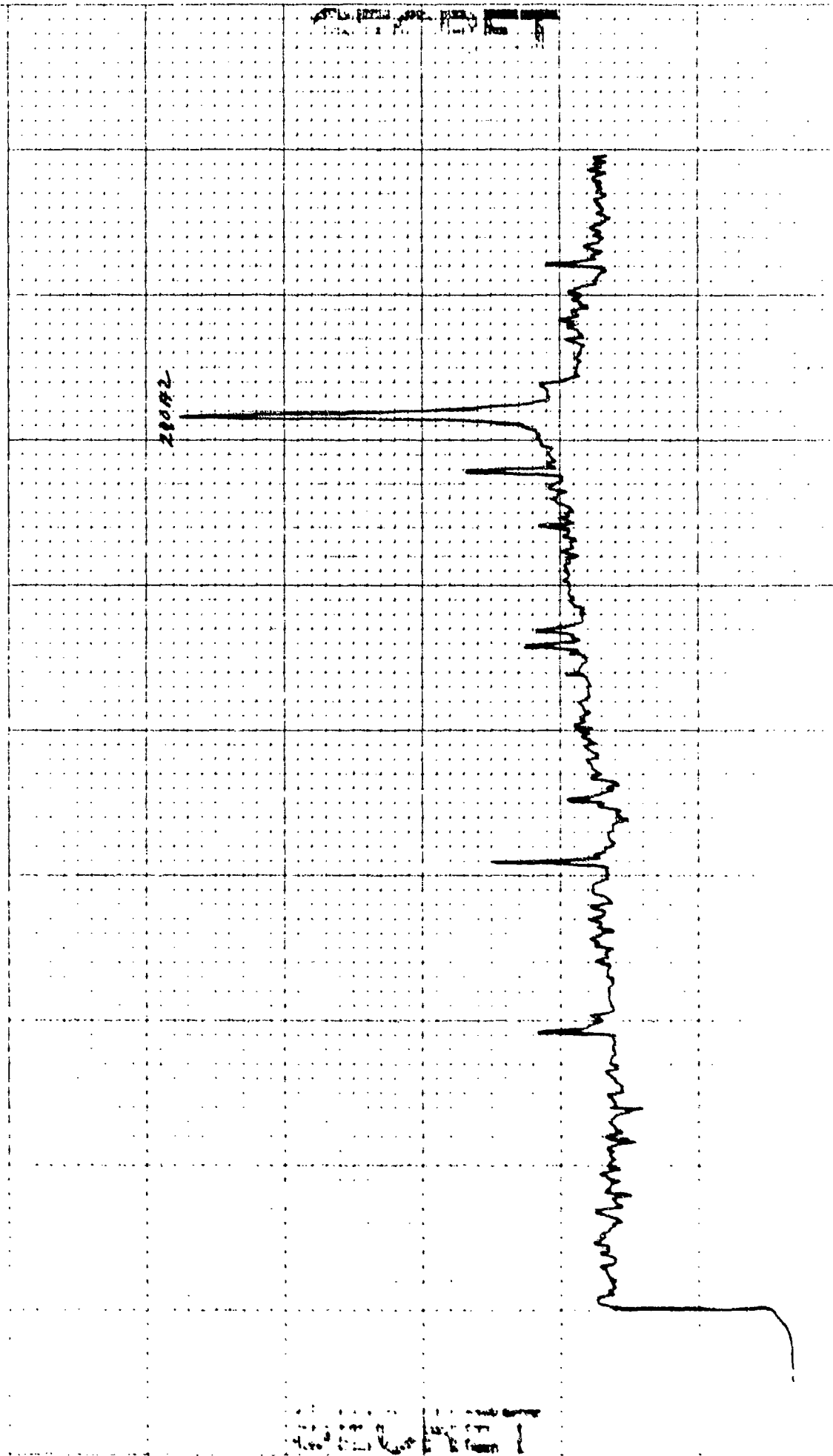
140#2

SECRET

SECRET

45 0703

CONTROL: 2131-22 (2PP)      DATE OF ANALYSIS: 1-26-77      REEL: H10      INDE X3626  
BEAMFORMED SPECTRUM(ELEMENTS)      1-26-77-34  
EXERCISE: BEARING STAKE      DATE/TIME: 3-15-77-2131Z      INTEGRATION TIME 320 SECS      ATTN: -24DB  
CENTER FREQ: 276 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
32 ELEMENTS      +44 DEG. AZ STEERING



SECRET

SECRET

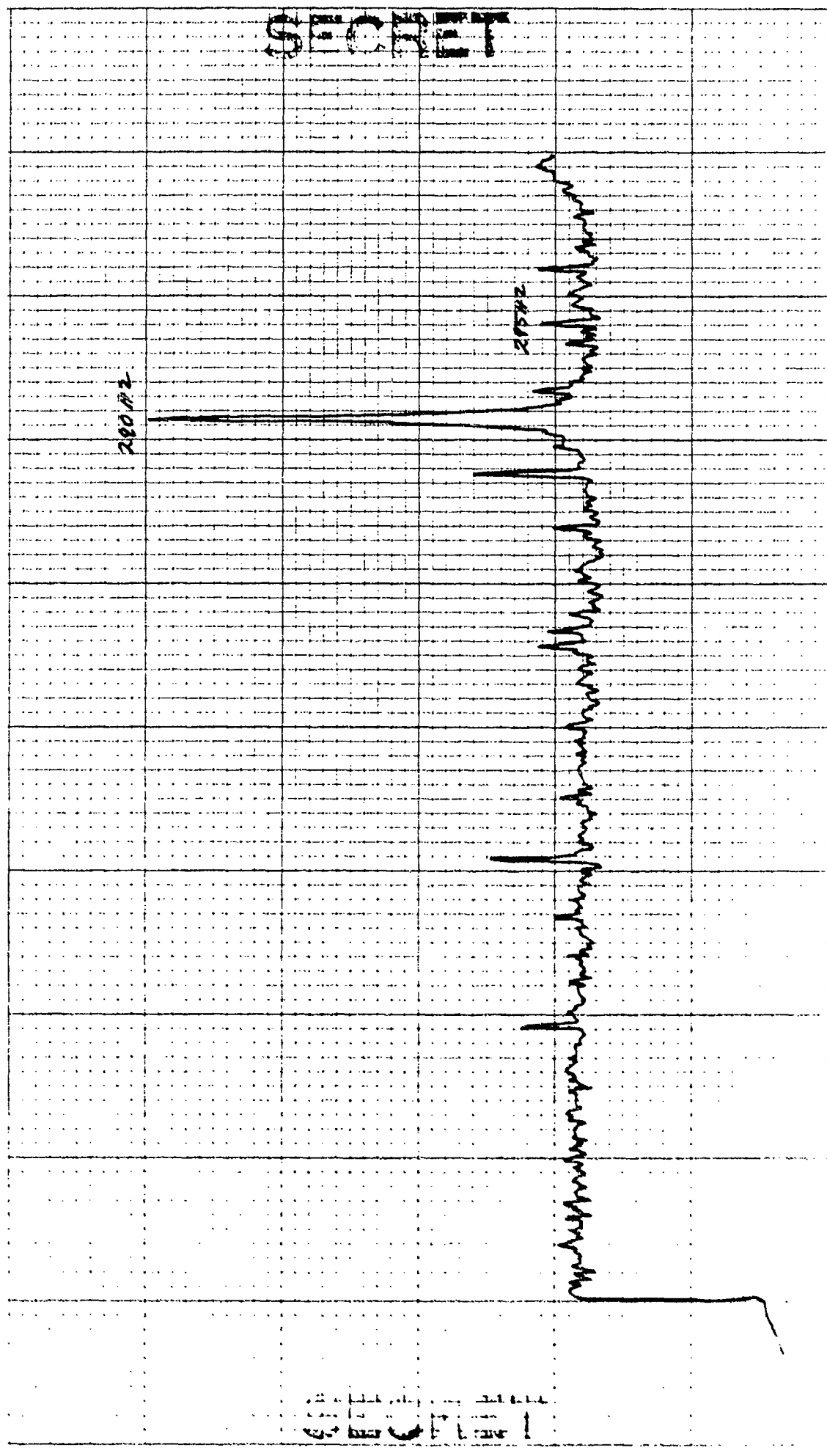
Page 10 of 10

46 0703

CONTROL: 2131 - 72 (200)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-89  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
46 DEG. AZ STEERING

REEL: 110  
INTEGRATION TIME 320 SECS  
FILTER  
ATTN: -24 DB  
WTG: HANNING  
INDE X 300



SECRET

SECRET



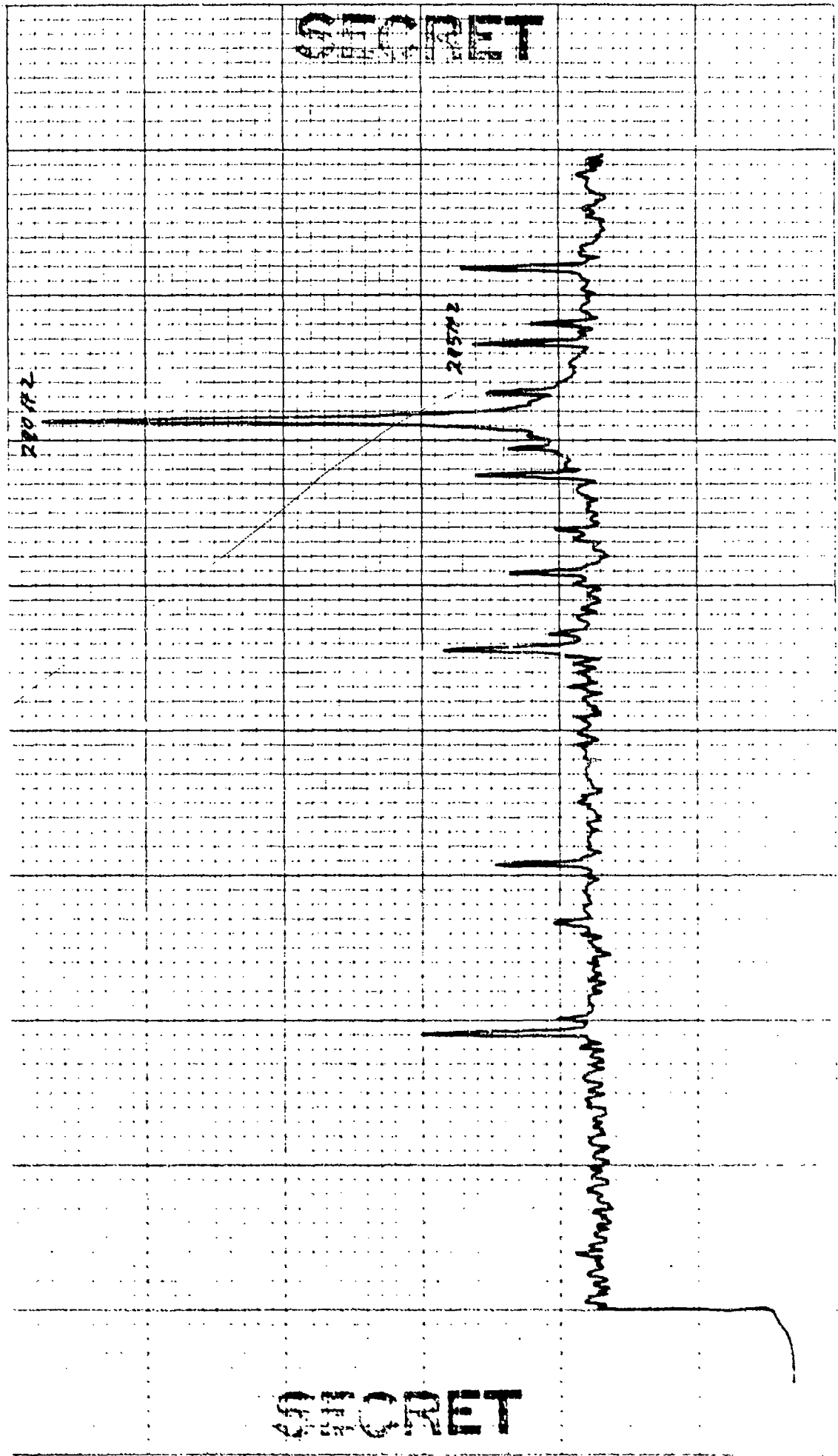
1-2 15/10 10/10 10/10 10/10

46 0703

CONTROL: 2131 - 32 (009)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
72 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
40 DEG. AZ STEERING

REEL: 110  
INTEGRATION TIME 320 SECS  
ATTEN: -24 DB  
WTC: HANNING  
INDE X 300



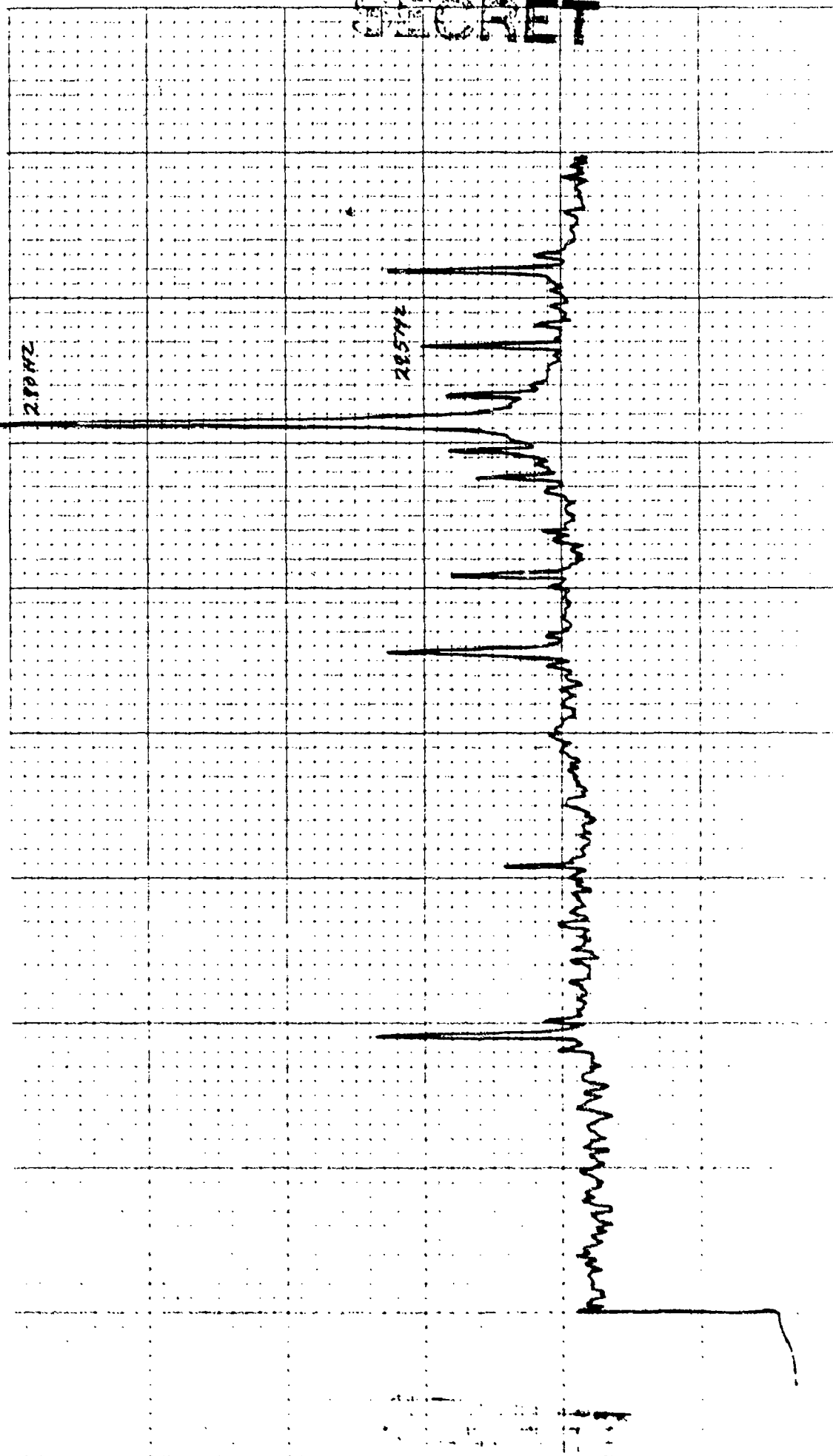
46 0703

CONTROL: 2171 - 32 (D09)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32- ELEMENTS

DATE OF ANALYSIS: 1-26-82 21-34  
DATE/TIME: 3-15-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+50 DEG. AZ STEERING

REEL: M10 INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: -24 DB  
FILTER WTG: HANNING



SECRET

102 12.2 TO THE HCH. 12.2

46 0703

**SECRET**

CONTROL: 2131 - 51 (P19)  
BEAMFORMED SPECTRUM(ELEMENTS 17020 297034)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

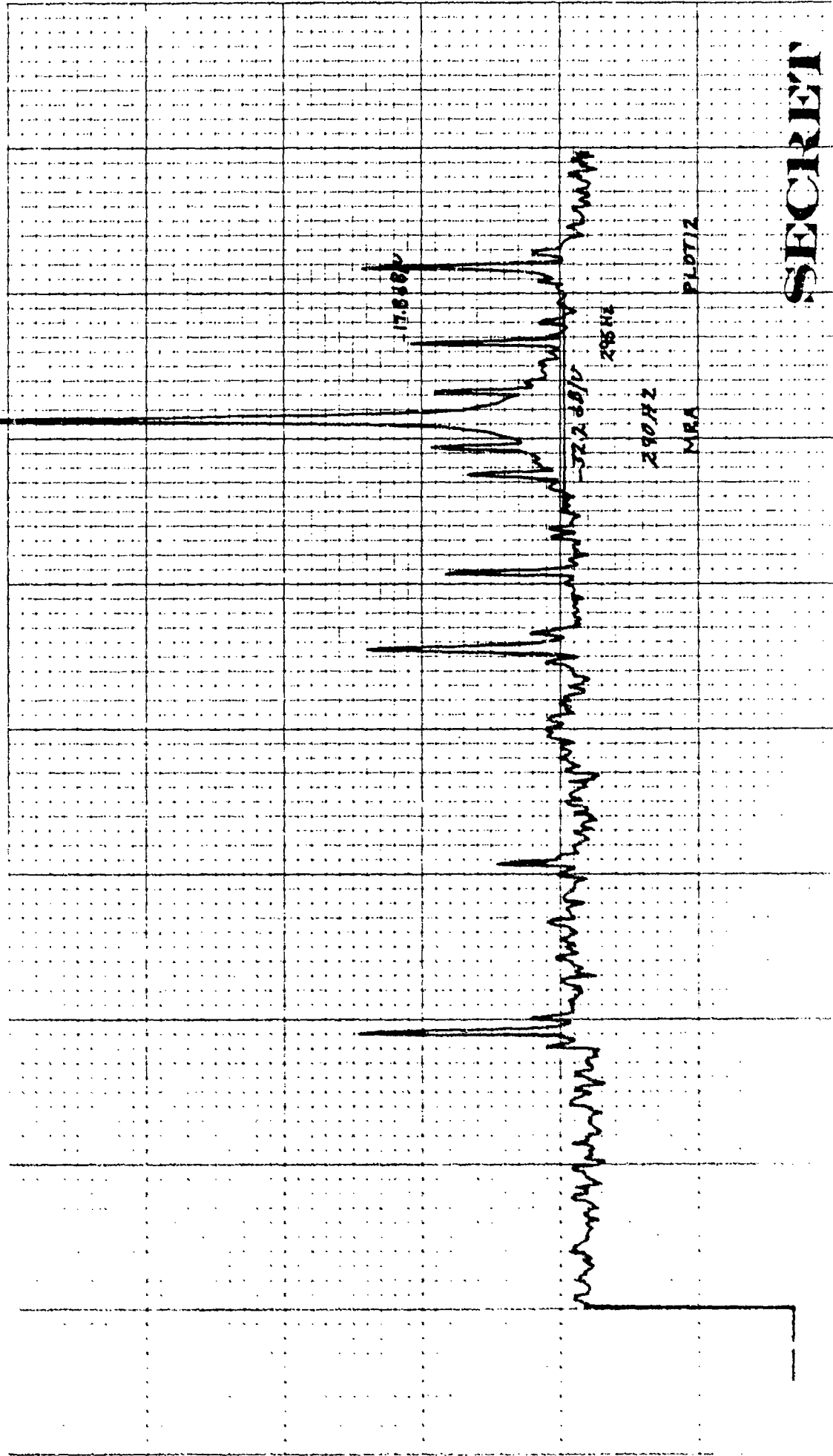
DATE OF ANALYSIS: \_\_\_\_\_  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+51.5 DEG. AZ STEERING

REEL: M10

INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: - DB  
FILTER WTG: HANNING

+20dB



282 HZ

270 HZ

208 HZ

**SECRET**

46 0703

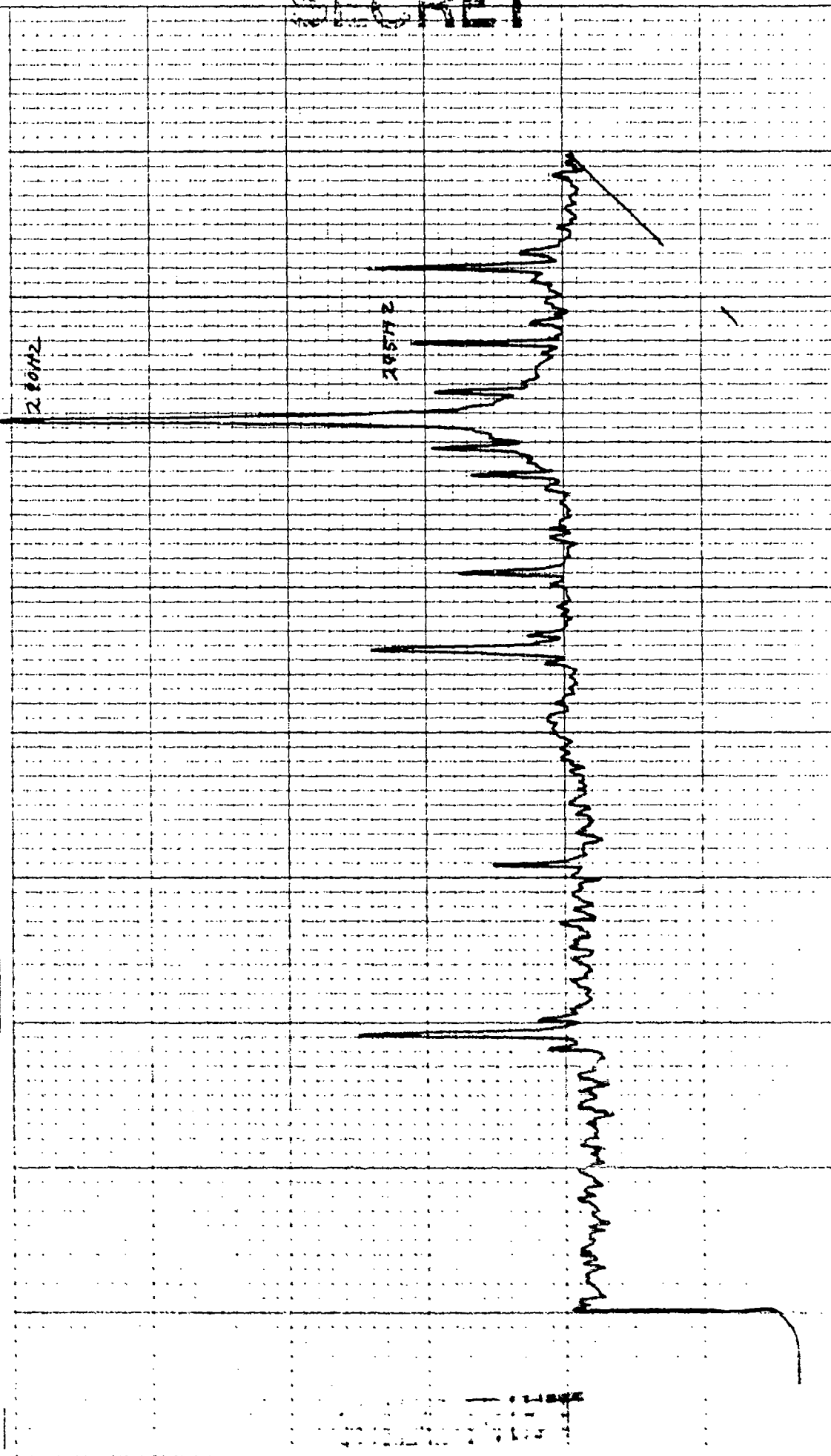
10 X 10 TO THE INCHES: 1.0 INCHES

CONTROL: 231 - 22 (DP1)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 22 ELEMENTS

DATE OF ANALYSIS: 1-26-78 (34)  
 DATE/TIME: 3-15-77 - 2131Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 +5/ DEG. AZ STEERING

REEL: 410  
 INTEGRATION TIME 320 SECS  
 FILTER  
 ATTN: 2Y DB  
 WTG: HANNING

INDE X3620



SECRET

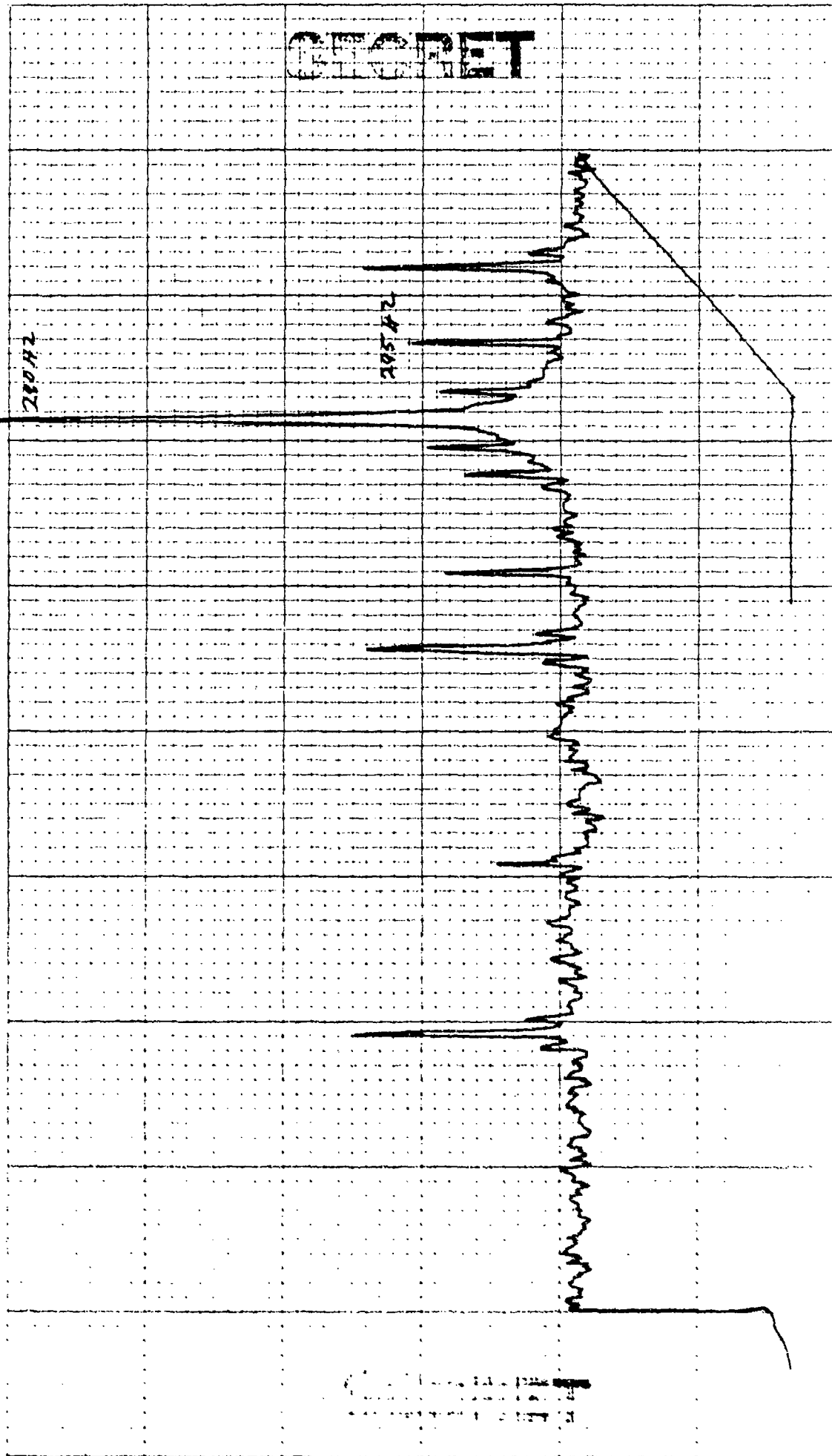
10-22 11:00 TO THE DEPT. OF DEFENSE

46 0703

CONTROL: 2131 - 32 (309)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
72 ELEMENTS

DATE OF ANALYSIS: 1-26-82  
DATE/TIME: 7-15-77 - 217/Z  
ANALYSIS BANDWIDTH: 1/10HZ  
752 DEG. AZ STEERING

REEL: 410 INDE X3020  
INTEGRATION TIME 320 SECS  
ATTEN: -24 DB  
FILTER WTC: HANNING

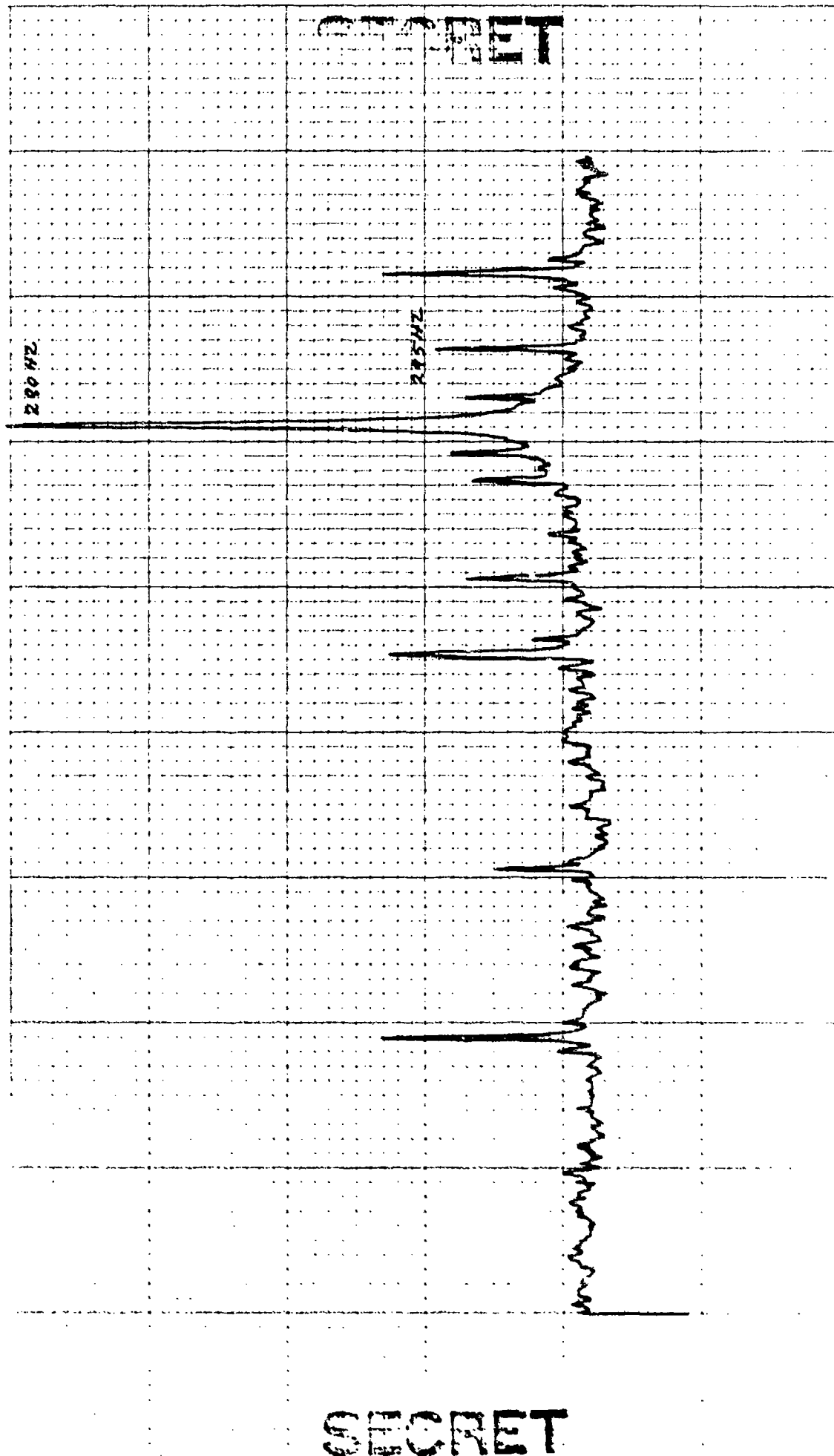


46 0703

CONTROL: 2031 - 32 (209)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: ~ - -  
 1-26-77  
 DATE/TIME: 3-7-77 - 203 / Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 154 DEG. AZ STEERING

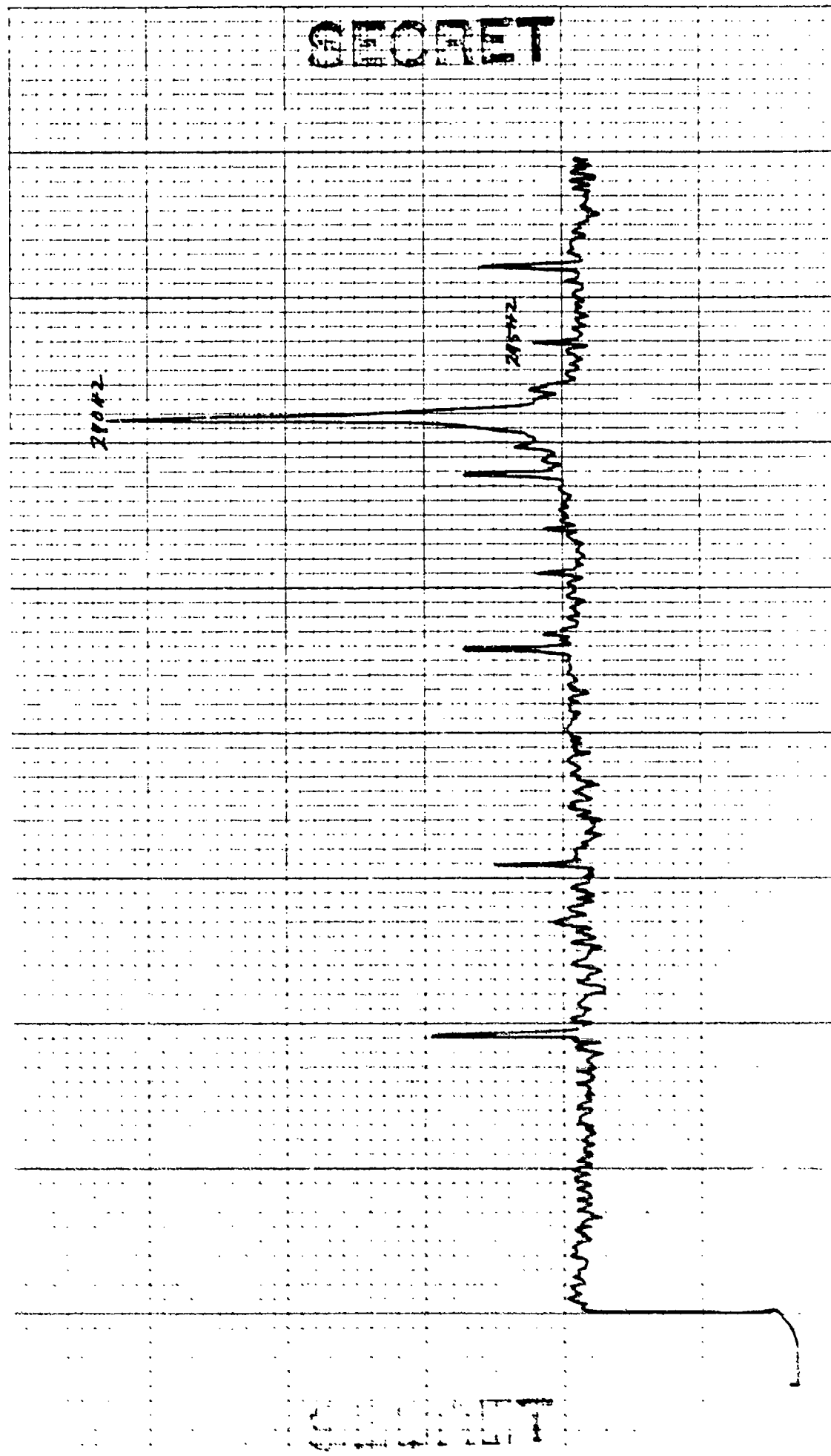
REEL: \_\_\_\_\_ INDEX: \_\_\_\_\_  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING  
 ATTN: DB



[illegible]

REEL: H10 INDEX: X362c

INTEGRATION TIME 320 SECS ATTEN: 24 DB  
FILTER WTC: HANNING

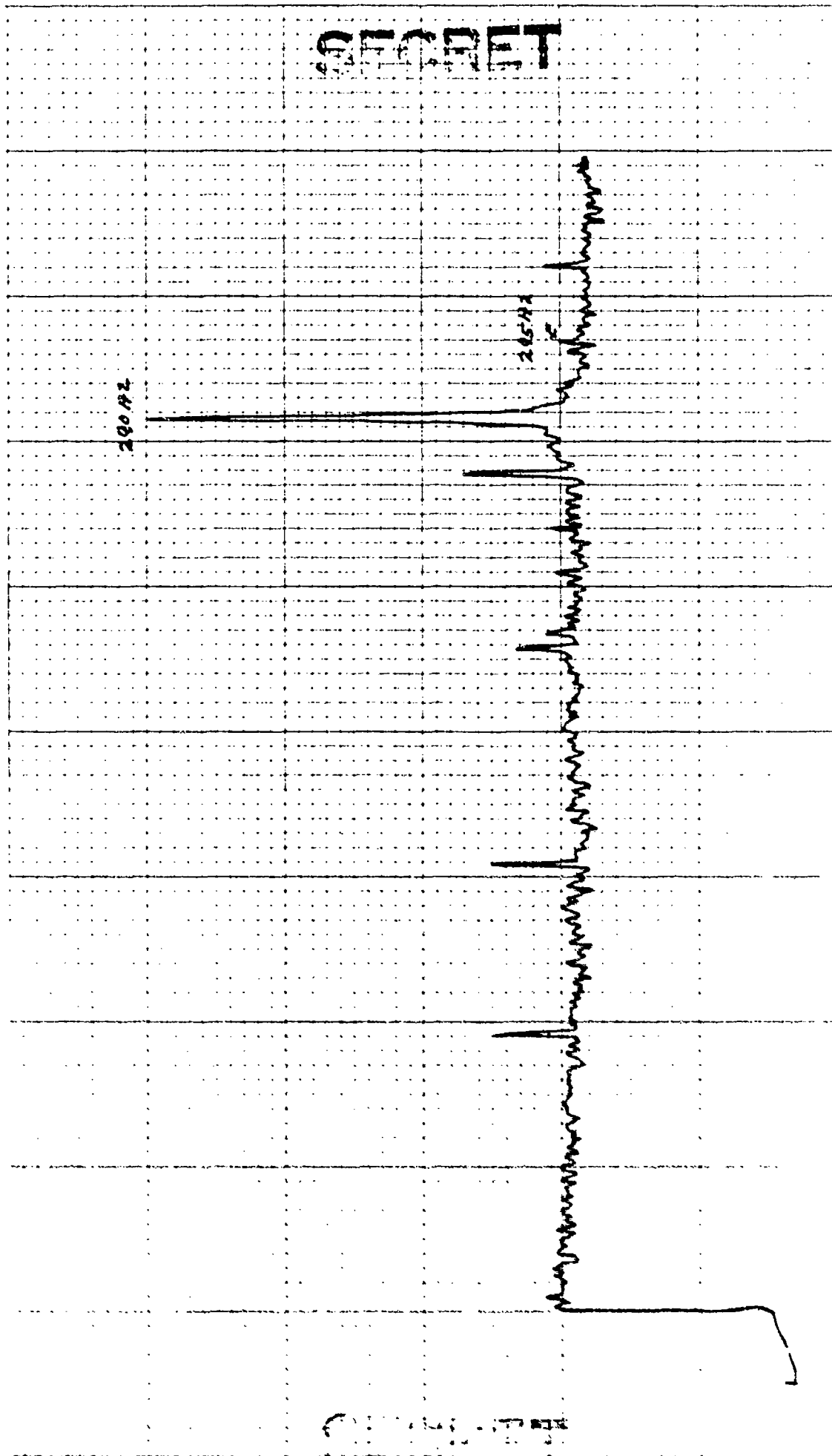


46 0703

CONTROL: 2171 - 32 (209)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
72 ELEMENTS

DATE OF ANALYSIS: 1-26-89 09-34  
DATE/TIME: 3-15-77 - 3181 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+50 DEG. AZ STEERING

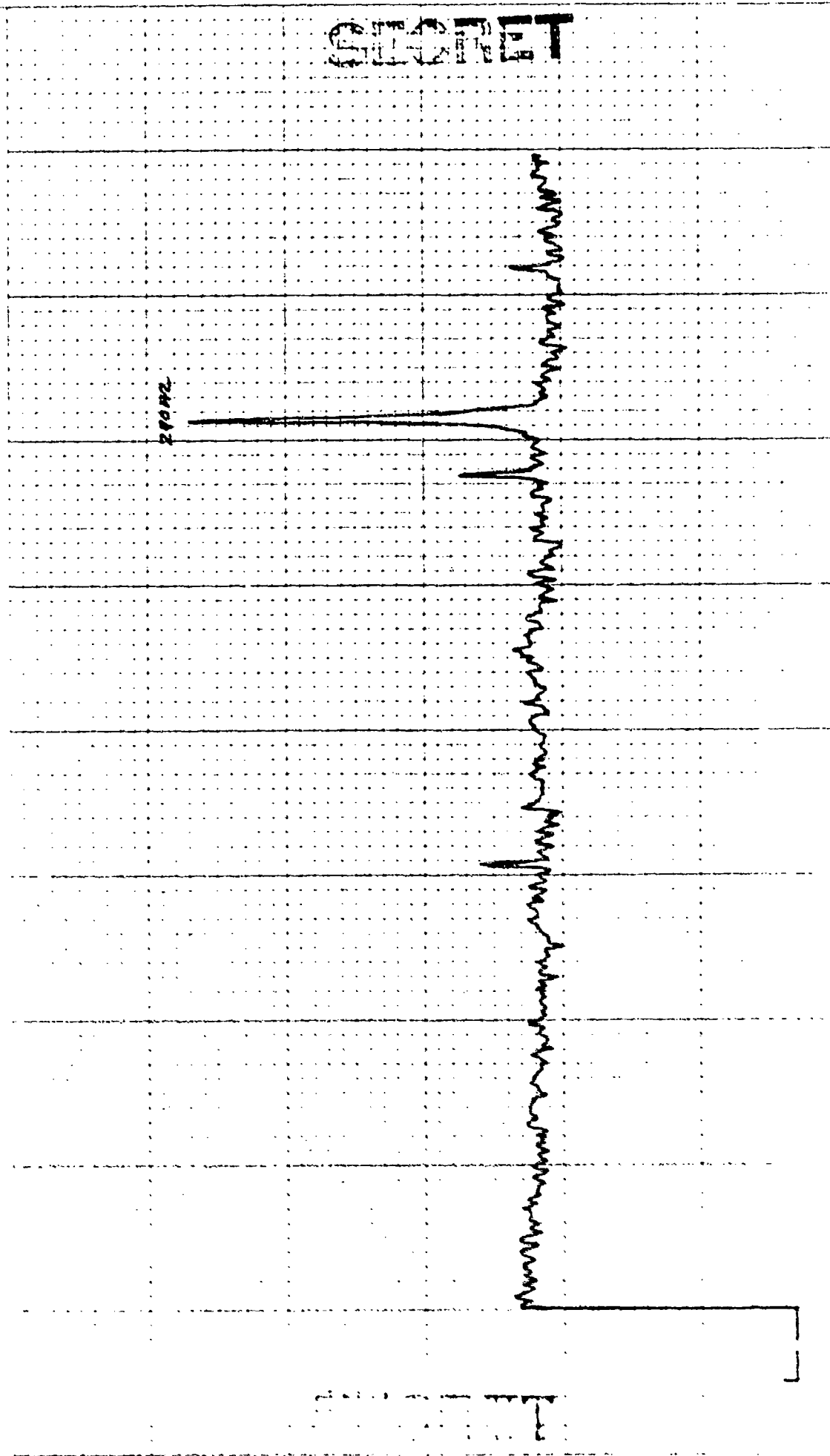
REEL: 410  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -24 DB  
WTC: HANNING  
INDEX 3620





46 0703

CONTROL: 2131 - 22 (DPT)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS  
DATE OF ANALYSIS: - - -  
1-26-77)  
DATE/TIME: 3-5-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 60 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -2Y DB  
WTG: HANNING  
REEL: 410  
INDE X3600



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

|                                |              |                                      |
|--------------------------------|--------------|--------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-23.6</u> |                                      |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -13.6                                |
| BEAMFORMER GAIN                | <u>+30</u>   | +46.4 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .2</u>  | +14.6 SIG. LEVEL FOR SIGNAL GAIN     |

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-69.2</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -59.2                                 |
| BEAMFORMER GAIN                | <u>+30</u>   | -29.2 NOISE LEVEL FOR SNR CALCULATION |

SECTION 13

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>+16.4</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-29.2</u> | 45.6                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | 41.6                  |
| MRA CORRECTION       | <u>+ .2</u>  | 41.8 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-0.2</u>  | 53.6 SNR 1 HZ BAND    |

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

|                                |              |                                      |
|--------------------------------|--------------|--------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-18.2</u> |                                      |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -8.2                                 |
| BEAMFORMER GAIN                | <u>+30</u>   | +21.8 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .8</u>  | +22.6 SIG. LEVEL FOR SIGNAL GAIN     |

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-71.4</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -61.4                                 |
| BEAMFORMER GAIN                | <u>+30</u>   | -31.4 NOISE LEVEL FOR SNR CALCULATION |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>+21.8</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-31.4</u> | 53.2                  |
| PROCESSOR CORRECTION | <u>-4.0</u>  | 49.2                  |
| MRA CORRECTION       | <u>+ .8</u>  | 50.0 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-8.2</u>  | 41.8 SNR 1 HZ BAND    |

CONFIDENTIAL

**CONFIDENTIAL**

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

|                                |              |                                      |
|--------------------------------|--------------|--------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-56.3</u> |                                      |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -46.3                                |
| BEAMFORMER GAIN                | <u>+20</u>   | -16.3 SIG. LEVEL FOR SNR CALCULATION |
| MRA CORRECTION                 | <u>+ .8</u>  | -15.5 SIG. LEVEL FOR SIGNAL GAIN     |

NOISE LEVEL

|                                |              |                                       |
|--------------------------------|--------------|---------------------------------------|
| MCPS-32 SIGNAL LEVEL INDICATED | <u>-71.4</u> |                                       |
| MCPS-32 CAL. CORRECTION        | <u>+10</u>   | -61.4                                 |
| BEAMFORMER GAIN                | <u>+20</u>   | -31.4 NOISE LEVEL FOR SNR CALCULATION |

SIGNAL-NOISE-RATIO

|                      |              |                       |
|----------------------|--------------|-----------------------|
| SIGNAL LEVEL FOR SNR | <u>-16.3</u> |                       |
| SIGNAL LEVEL FOR SNR | <u>-31.4</u> | 15.1                  |
| PROCESSOR CORRECTION | <u>-4.2</u>  | 10.9                  |
| MRA CORRECTION       | <u>+ .8</u>  | 11.7 SNR 1/10 HZ BAND |
| BANDWIDTH CONVERSION | <u>-0.2</u>  | 3.5 SNR 1 HZ BAND     |

**CONFIDENTIAL**

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

|                        | <u>140 HZ</u> | <u>200HZ</u> | <u>205HZ</u> |
|------------------------|---------------|--------------|--------------|
| MEAN OMNI SIGNAL LEVEL | <u>-19.4</u>  | <u>-12.5</u> | <u>N.D</u>   |
| MRA SIGNAL LEVEL       | <u>+16.6</u>  | <u>+22.6</u> | <u>-15.5</u> |
| ARRAY SIGNAL GAIN      | <u>36.0</u>   | <u>35.1</u>  |              |
| 20 LOG <u>51</u>       | <u>34.1</u>   | <u>34.1</u>  | <u>34.1</u>  |
| # of elements          |               |              |              |
| DIFFERENCE             | <u>+ 1.9</u>  | <u>+ 1.0</u> |              |

ARRAY GAIN

|                                     |             |             |             |
|-------------------------------------|-------------|-------------|-------------|
| MRA SNR                             | <u>41.8</u> | <u>50.0</u> | <u>11.7</u> |
| MEAN OMNI SNR                       | <u>28.6</u> | <u>34.5</u> | <u>N.D.</u> |
| ARRAY GAIN                          | <u>13.2</u> | <u>15.5</u> |             |
| THEORETICAL AZMUTH GAIN<br>(at MRA) | <u>13.6</u> | <u>16.0</u> | <u>16.2</u> |
| DIFFERENCE                          | <u>- .4</u> | <u>- .5</u> |             |

CONFIDENTIAL

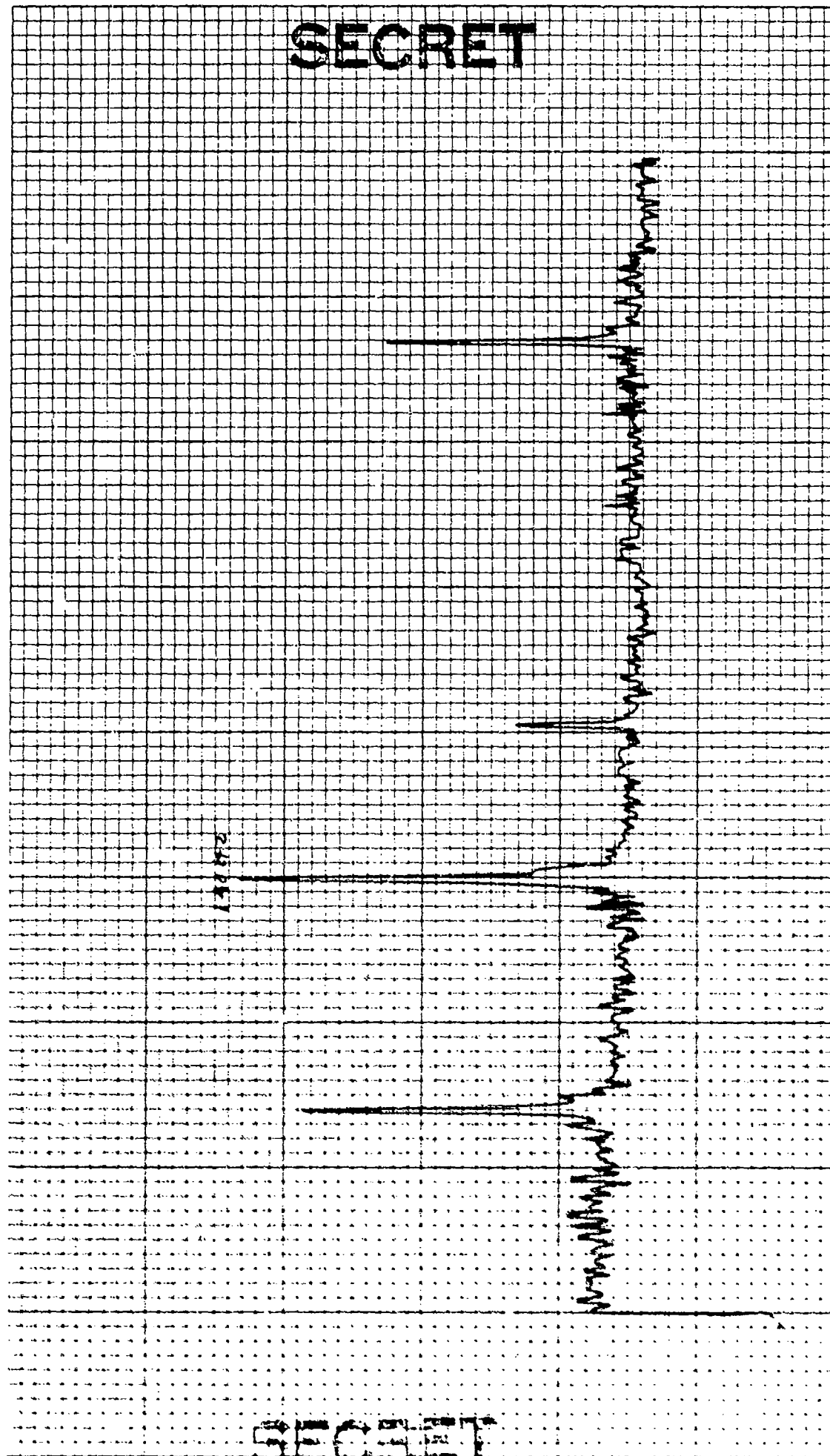
K-E 12 X 10 TO 100 INCHES  
EQUIP. & SUPPLY CO. MADE IN U.S.A.

46 0703

CONTROL: 2131-51 (208) DATE OF ANALYSIS: - - -  
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 20-53 )  
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 2/3/2  
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ  
57 ELEMENTS + 44 DEG. AZ STEERING

REEL: 4610 INDEX X3620

INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILTER WTG: HANNING



14. X 10 TO THE INCHES  
1-26 X 28-53  
MADE IN U.S.A.

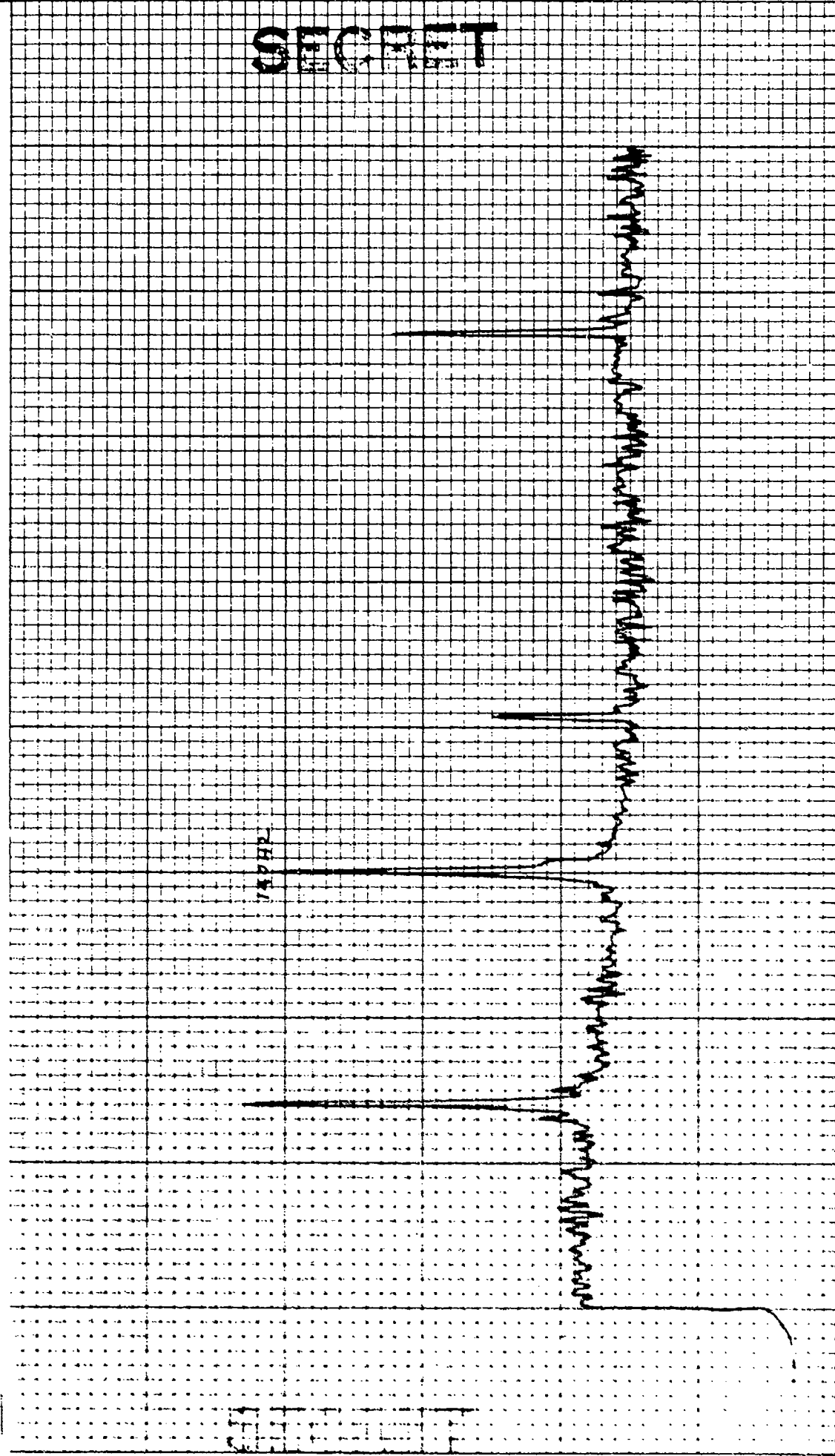
46 0703

CONTROL: 2131 - 51 (209)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
51 ELEMENTS

DATE OF ANALYSIS: - - -  
1-26 X 28-53  
DATE/TIME: 3-25-77 - 2131 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 46 DEG. AZ STEERING

REEL: 410  
INDE X3120

INTEGRATION TIME 320 SECS  
ATTEN: -70 DB  
WTG: HANNING  
FILTER



KSE 10 X 10 TO THE INCH 1/2 X 10 INCHES  
NEUFEL & ESSER CO. MADE IN U.S.A.

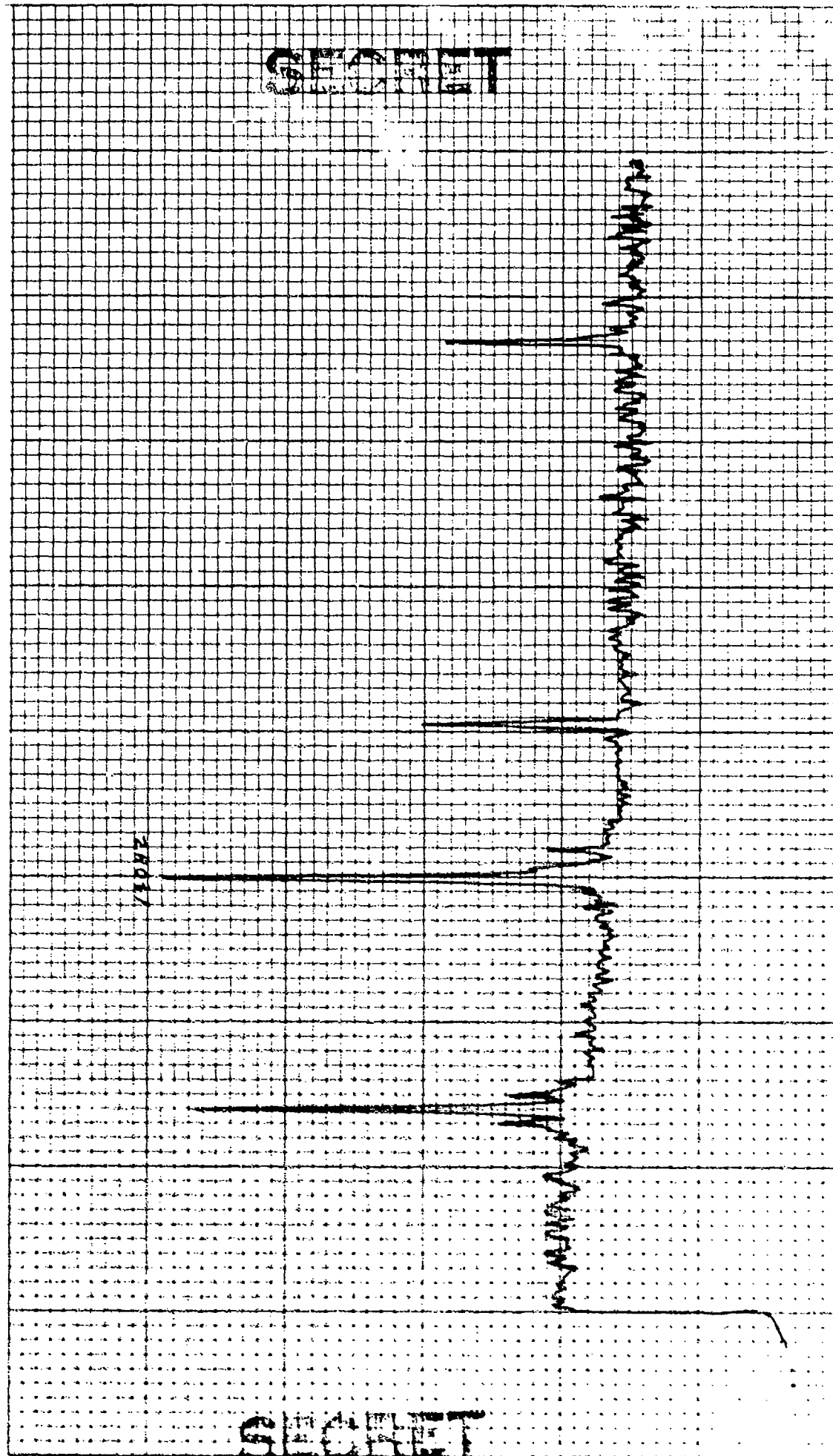
46 0703

CONTROL: 2/31 - 5/ (DP9)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-53  
DATE/TIME: 3-5-77 - 2/3/2  
ANALYSIS BANDWIDTH: 1/10 HZ  
+48 DEG. AZ STEERING

REEL: M10  
INDE X362

INTEGRATION TIME 320 SECS  
ATTEN: 30 DB  
FILTER  
WTG: HANNING

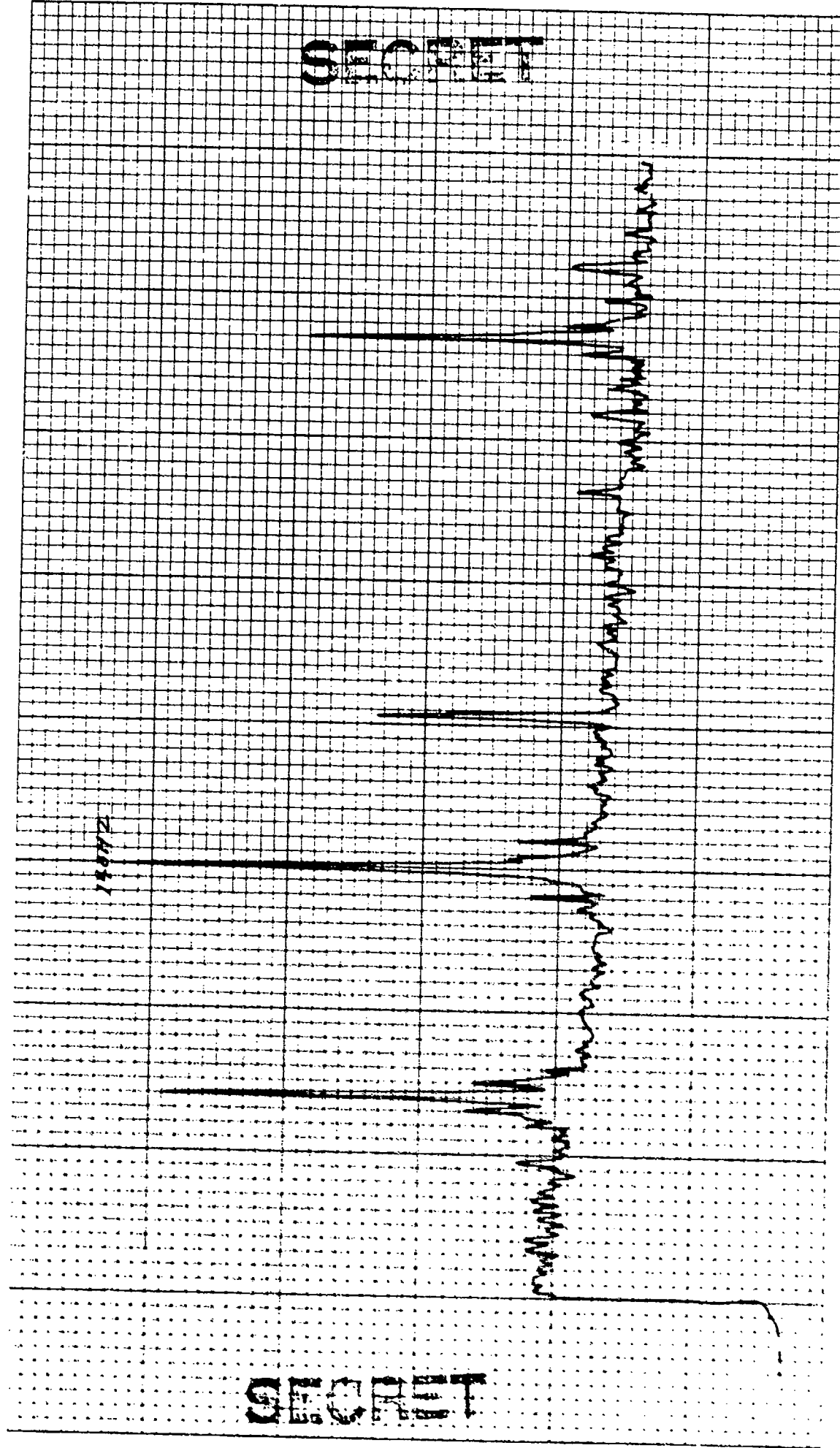




K-E 10 X 10 TO THE INCH = 7 X 10 INCHES  
KUPPEL & FISHER CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 5/ (D99) DATE OF ANALYSIS: 1-26-89-53 REEL: 1410 INDE XJ620  
BEAMFORMED SPECTRUM (ELEMENTS) 51 ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
ANALYSIS BANDWIDTH: 1/10 HZ  
INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILTER WTG: HANNING



HSE 10 X 10 TO THE INCH = 1 / 10 INCHES  
VEUFREL & ESSER CO. MADE IN U.S.A.

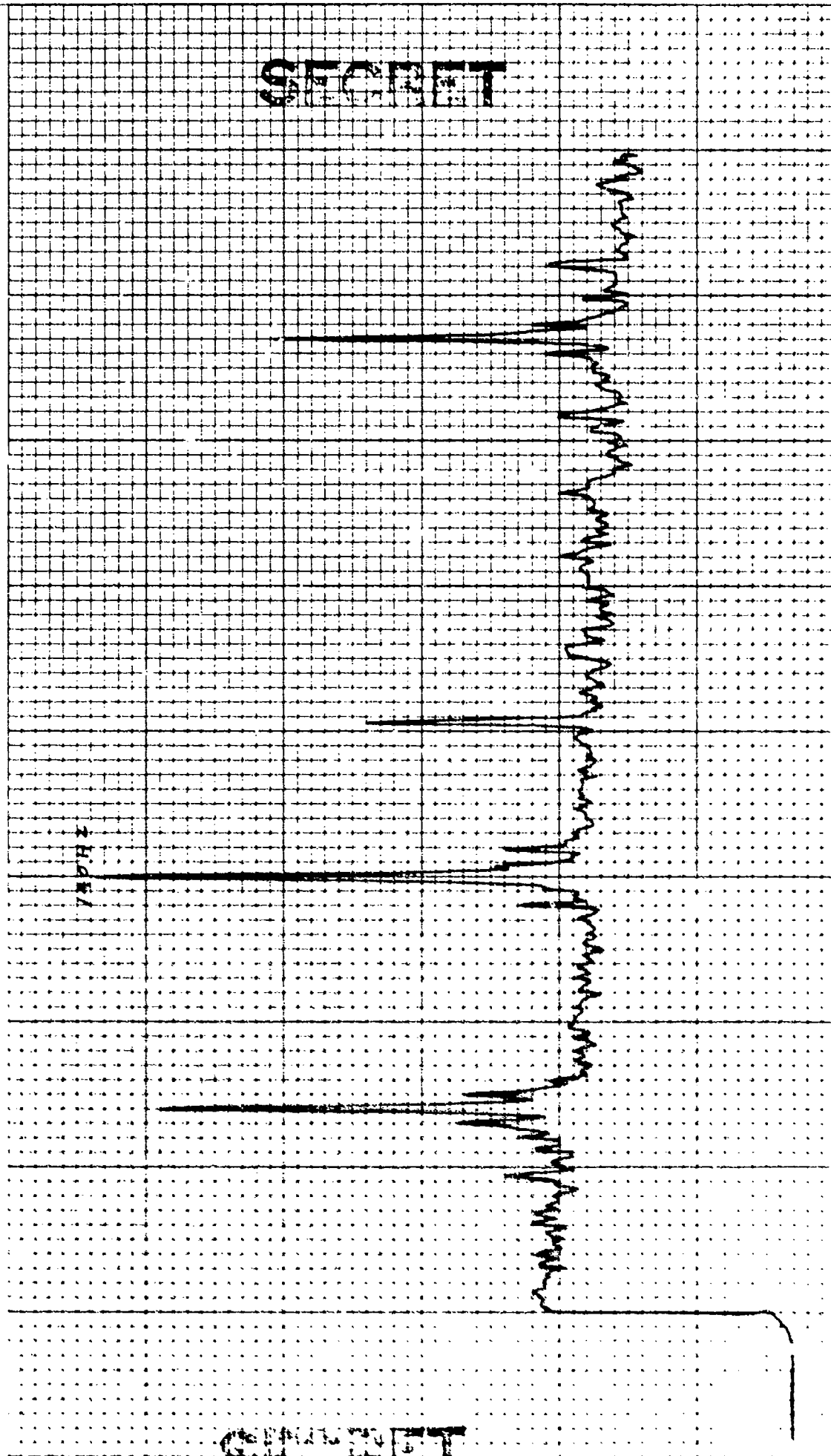
46 0703

CONTROL: 2131 - 51 (109)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENT'R FREQ: 150 HZ  
51 ELEMENTS

DATE OF ANALYSIS: - - -  
1-26-53  
DATE/TIME: 3-15-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 51 DEG. AZ STEERING

REEL: H10 INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILTER WTG: HANNING



46 0703

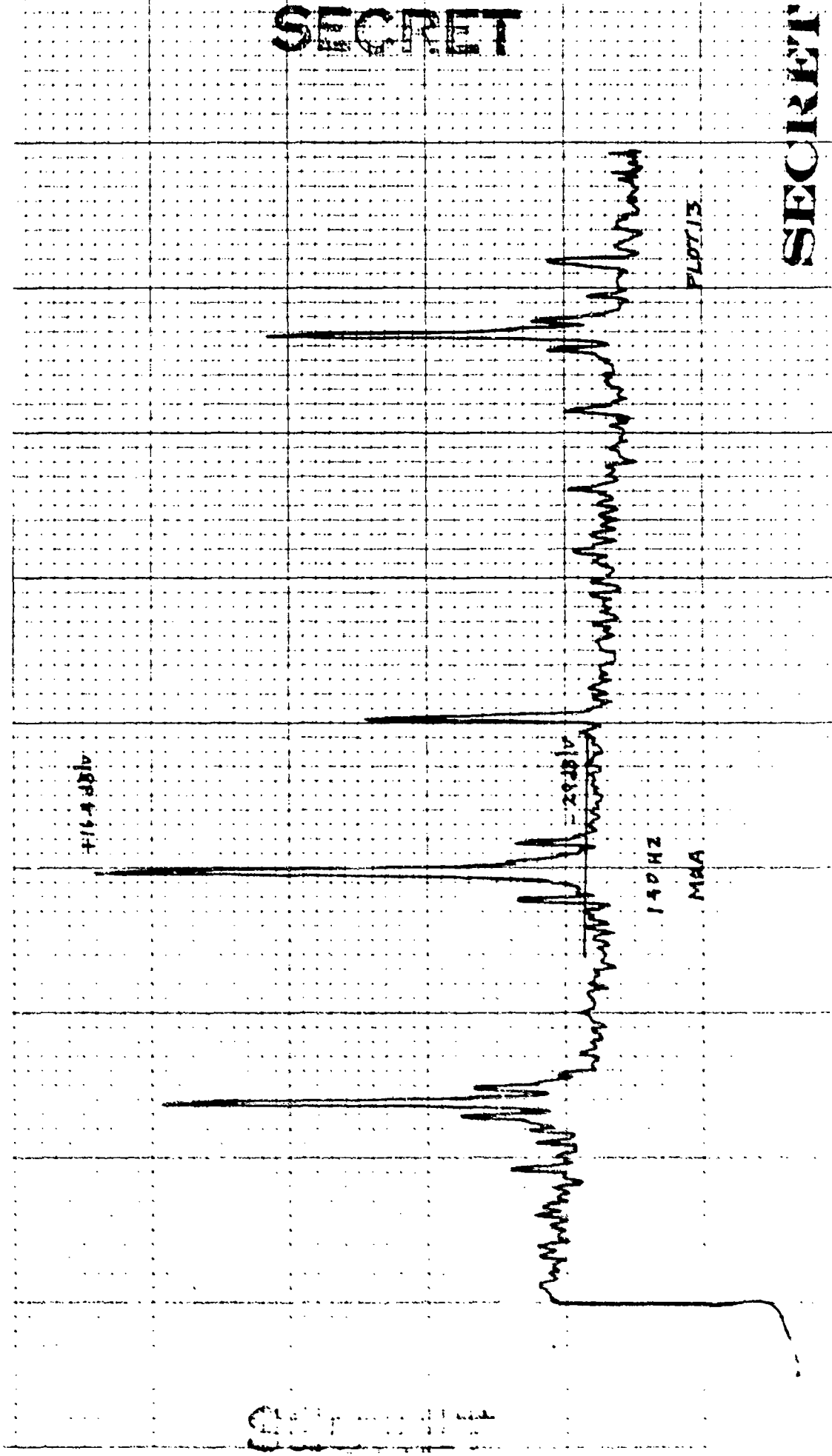
REF 2200 1000 1000 1000

**SECRET**

CONTROL: 2131 - 51 (DP9)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
51 ELEMENTS

DATE OF ANALYSIS: 17.26 297.53  
 DATE/TIME: 3-9-77 - 2131 2  
 ANALYSIS BANDWIDTH: 1/10 HZ  
151.5 DEG. AZ STEERING

REEL: M10 INDE X1120  
 INTEGRATION TIME 320 SECS  
 FILTER WIG: HANNING  
 ATTN: - DB



**SECRET**

**SECRET**

111 HZ

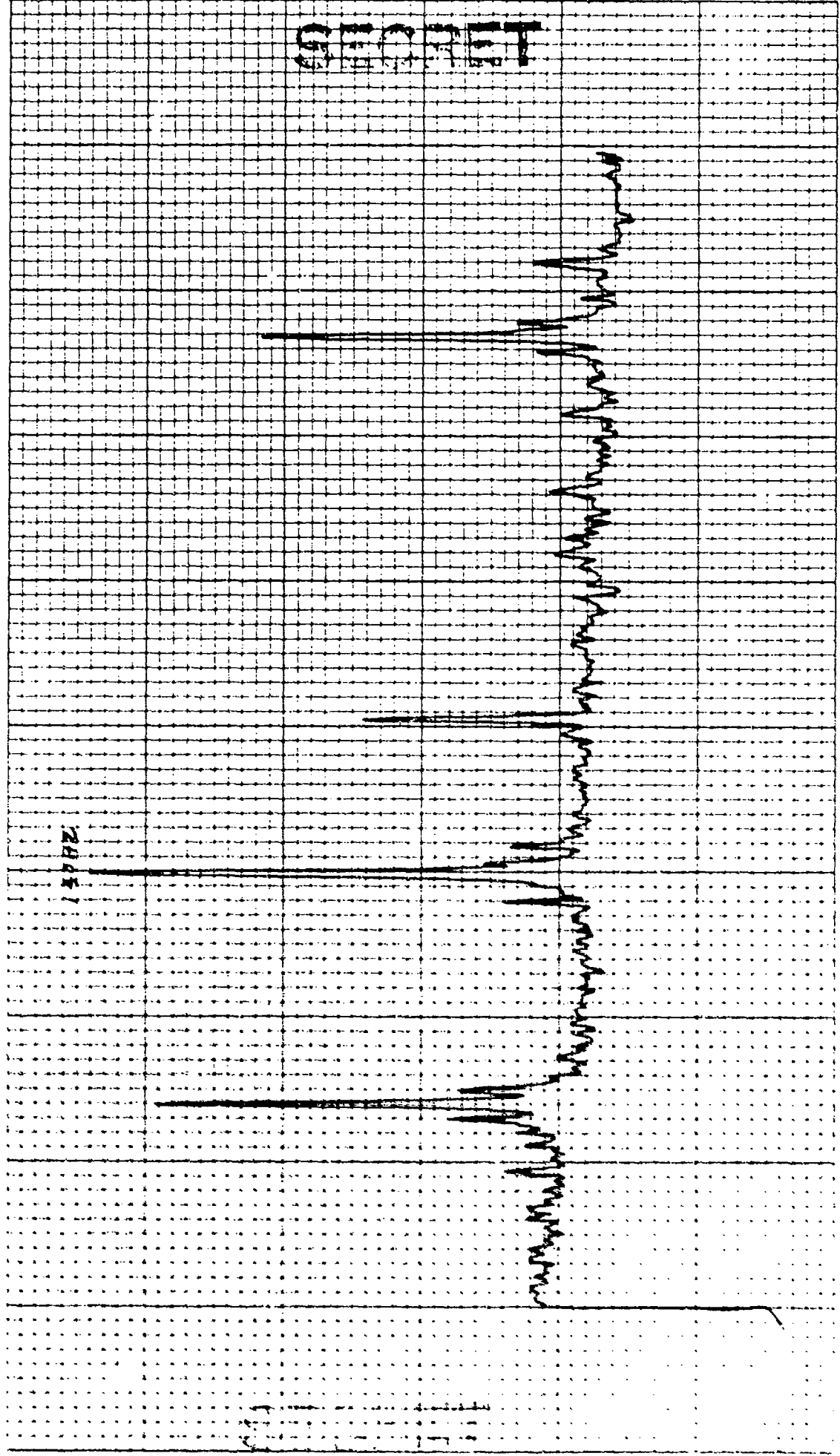
150 HZ

150 HZ

KOE 15.8 IS TO THE INCHES 1.4 IS INCHES  
PULPIT & POWER CO. WASH. D.C.

46 0703

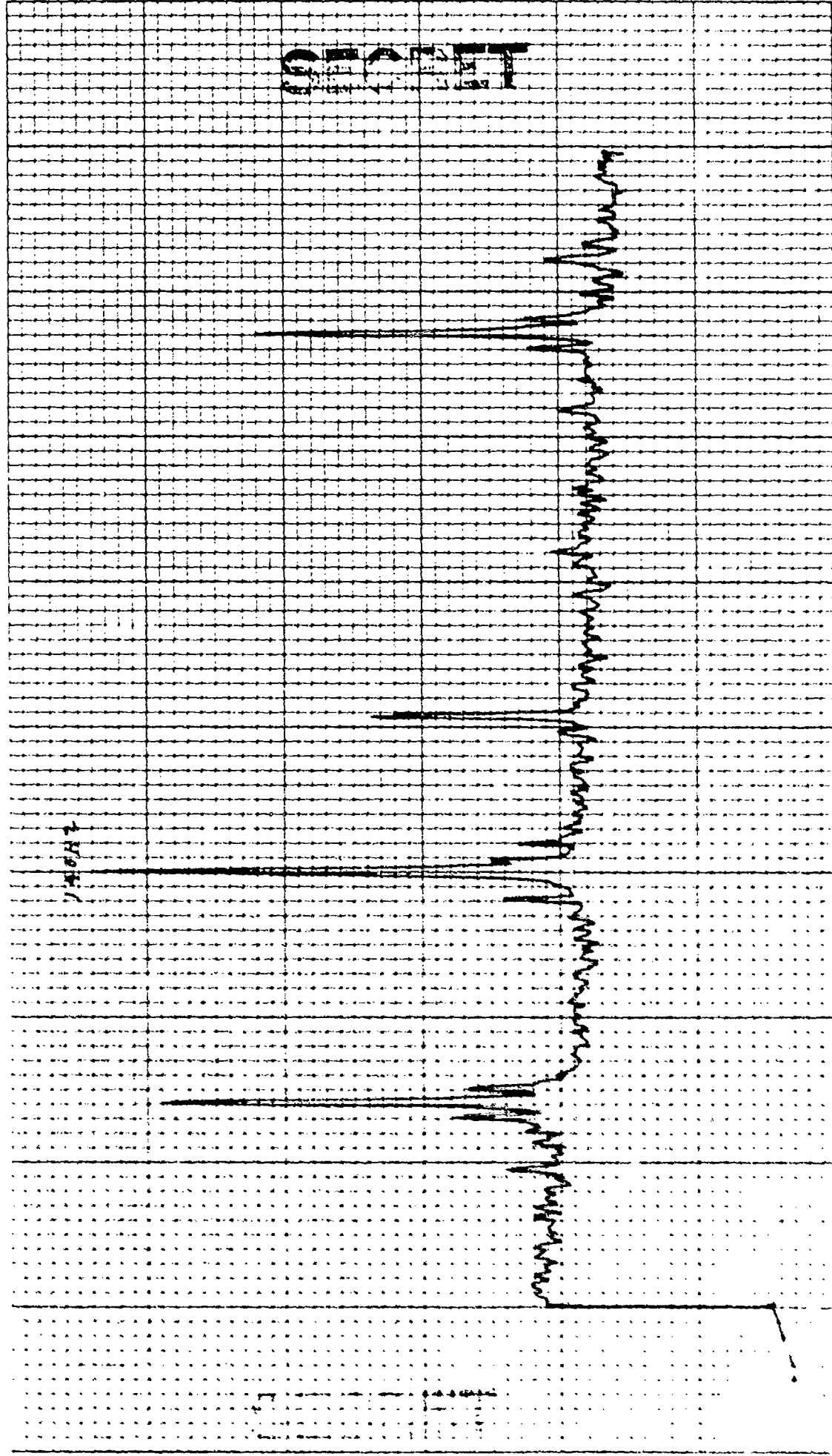
CONTROL: 2131 - 51 (DP9)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
51 ELEMENTS  
DATE OF ANALYSIS: 1-26-57  
DATE/TIME: 2-5-77 - 20/2  
ANALYSIS BANDWIDTH: 1/10 HZ  
+52 DEG. AZ STEERING  
REEL: H10  
INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
WTC: HANNING  
INDEX X 3620



KOE 10.4 IS TO THE INCHES 10.4 INCHES

46 0703

CONTROL: 2131 - 51 (DP8)  
BEAMFORMED SPECTRUM (ELEMENTS 1-264 01-53)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
51 ELEMENTS  
DATE OF ANALYSIS: 1-26-77  
DATE/TIME: 2-25-77 - 2131Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+54 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: -20 DB  
WTG: HANNING  
REEL: 410  
INDE X 3620



REF 10.1 TO THE USMC 10.1 10.1

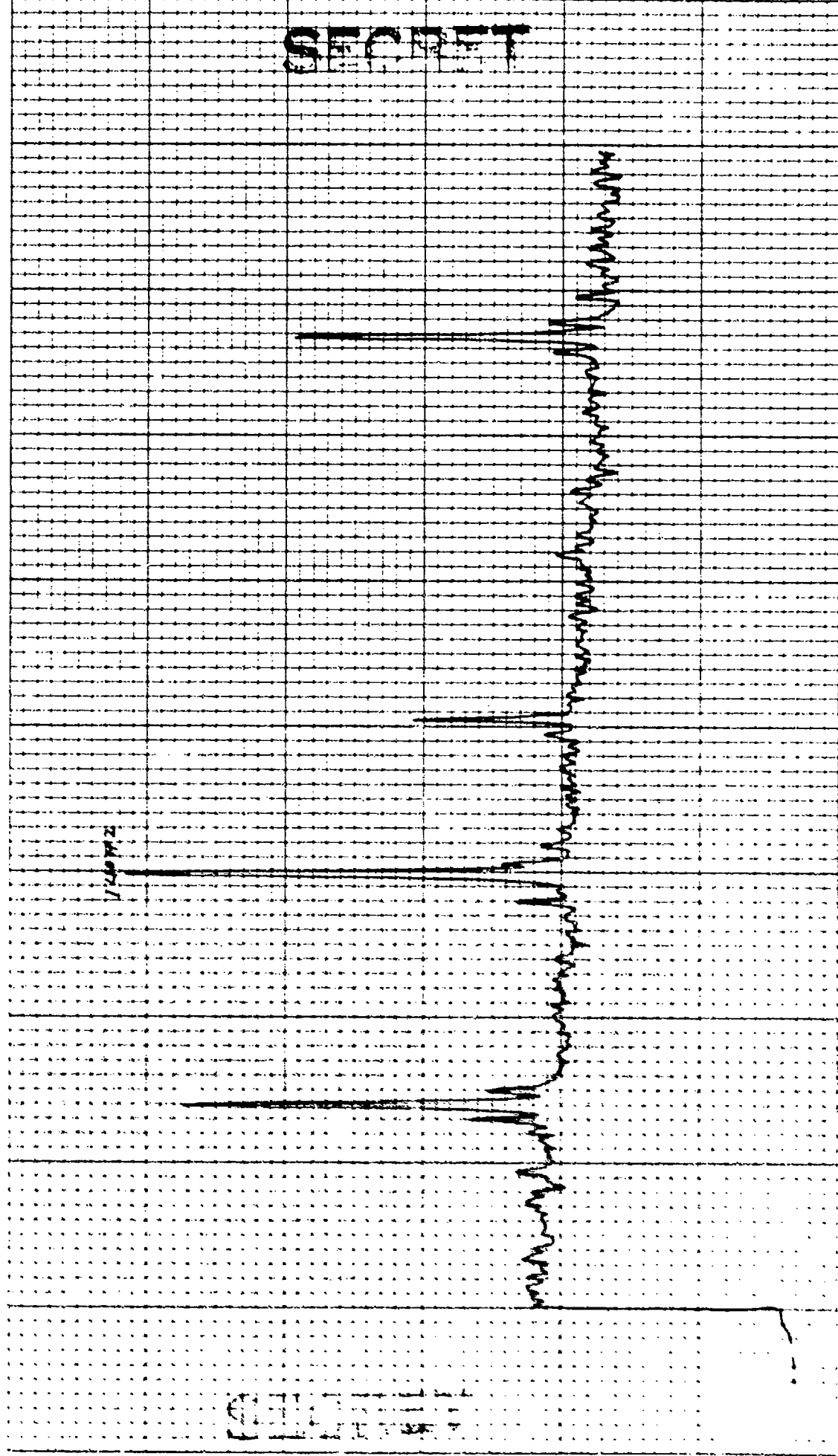
46 0703

CONTROL: 2131-57 (209)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
57 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53  
DATE/TIME: 3-15-77-213/2  
ANALYSIS BANDWIDTH: 1/10 HZ  
+56 DEG. AZ STEERING

REEL: M10  
INDE X3620

INTEGRATION TIME 320 SECS  
ATTEN: -3.0 DB  
FILTER WTC: HANNING



10 X 10 TO THE INCHES 1 A 10 INCHES  
REDFORD & PETER CO. MADE IN U.S.A.

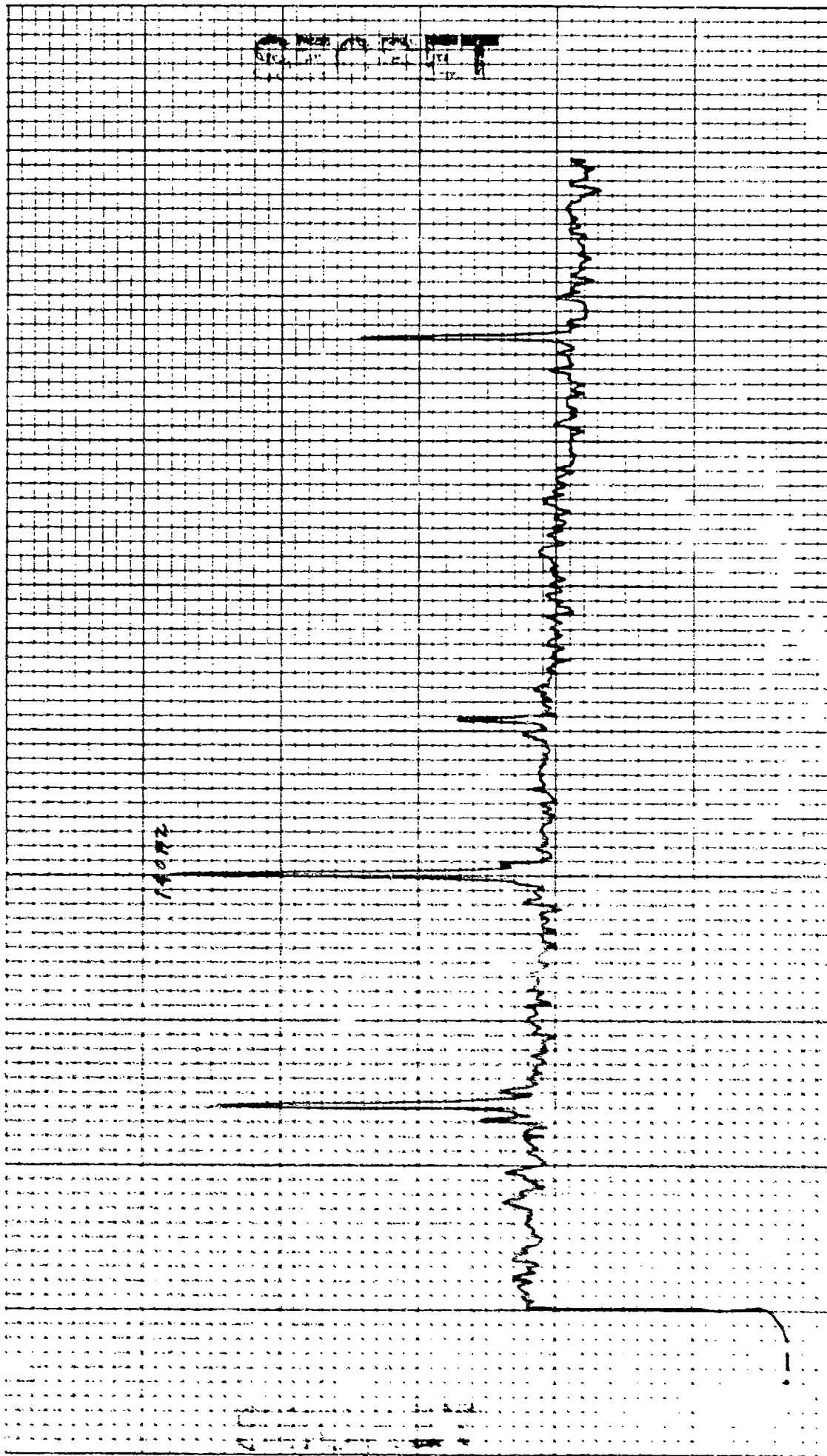
46 0703

CONTROL: 231 - 51 (DP9)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53  
DATE/TIME: 3-15-77-213/Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
450 DEG. AZ STEERING

REEL: M10  
INDE X 2620

INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILTER WTC: HANNING

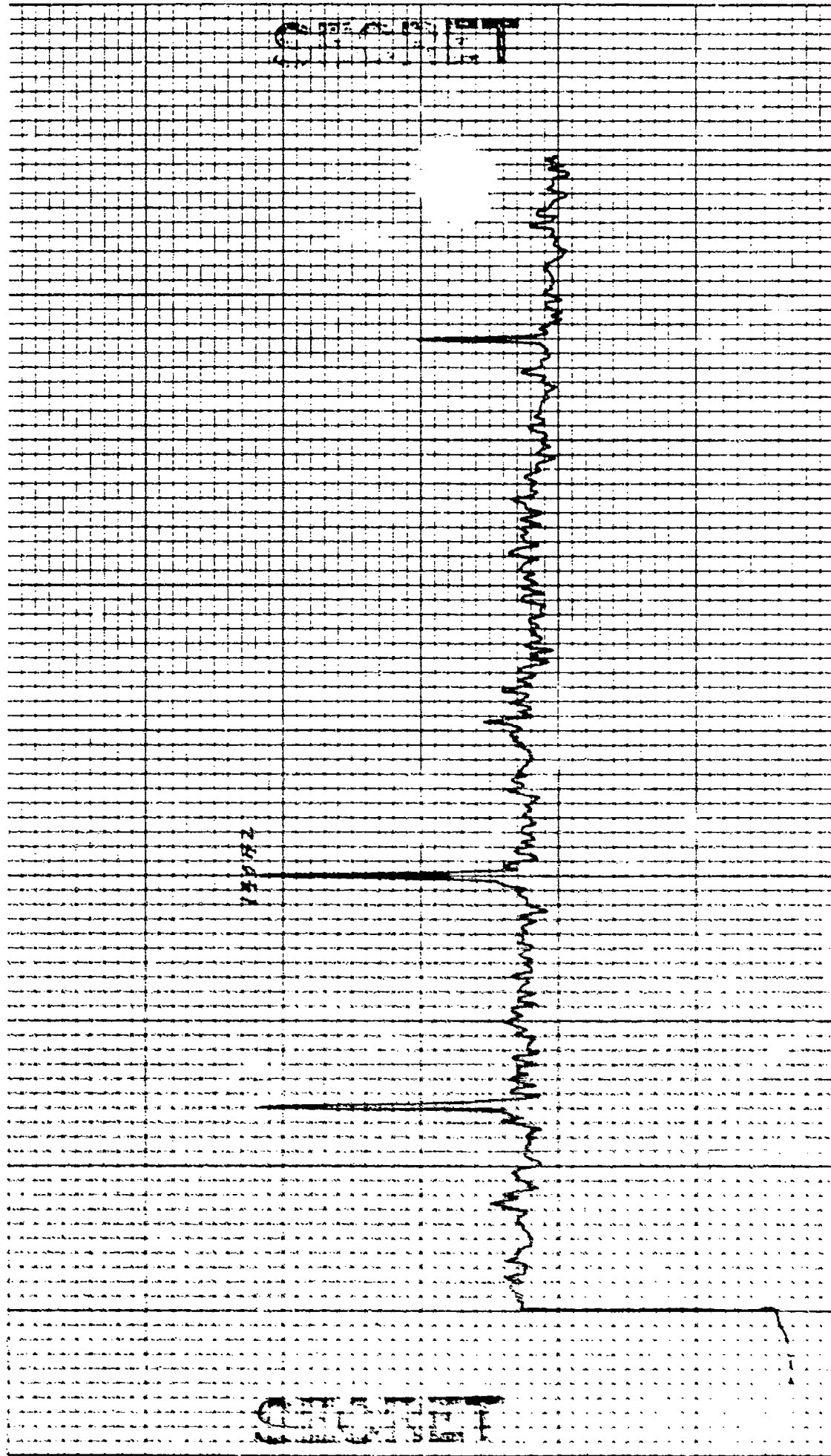


KOE 10 X 10 TO TIME INCHES 7 X 10 INCHES  
PLOTTER MODEL 1000 CO. MADE IN U.S.A.

45 0703

CONTROL: 2131 - 51 (DPQ)      DATE OF ANALYSIS: 1-26-53      REEL: 410      INDE X3620  
BEAMFORMED SPECTRUM(ELEMENTS)      DATE/TIME: 3-5-77 - 313/ Z      INTEGRATION TIME 320 SECS      ATTEN: -70DB  
EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
CENTER FREQ: 150 HZ      +60 DEG. AZ STEERING

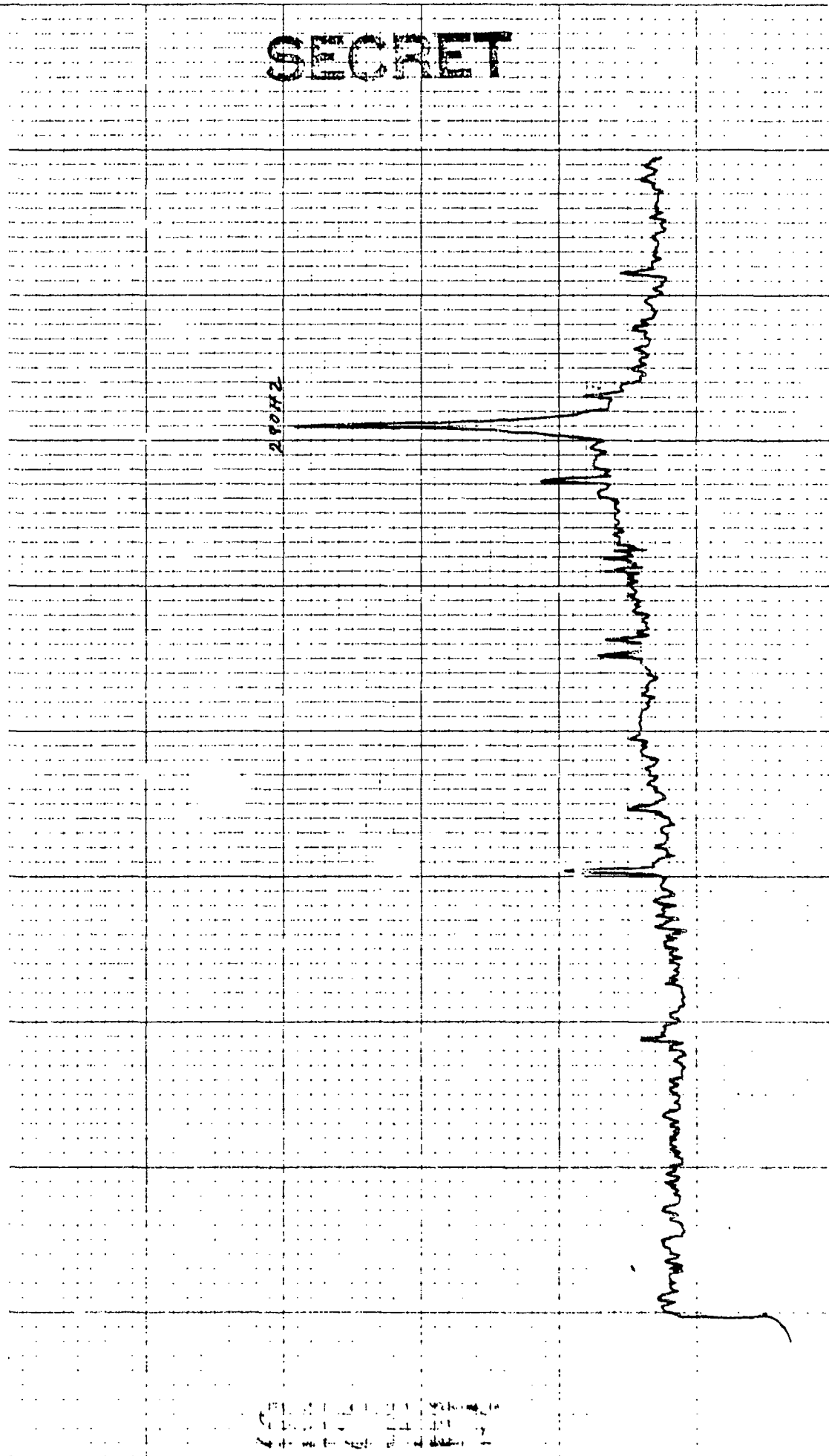
51 ELEMENTS





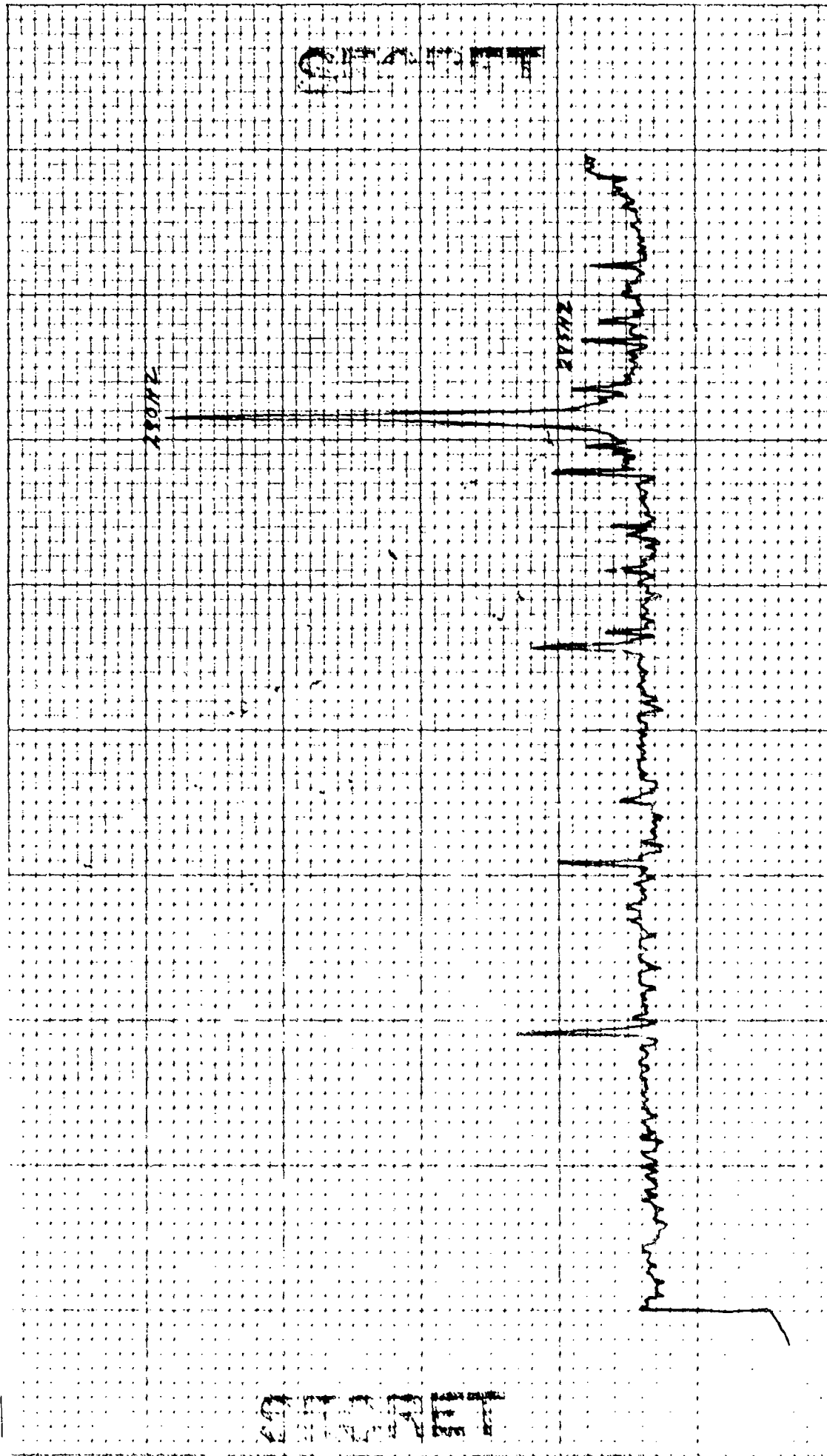
46 0703

**SECRET**



46 0703

CONTROL: 237 - 51 (DPF)  
BEAMFORMED SPECTRUM/ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
51 ELEMENTS  
DATE OF ANALYSIS: 1-26-89  
DATE/TIME: 3-5-77 - 2137 Z  
ANALYSIS BANDWIDTH: 1710 HZ  
+ 46 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS  
FILTER  
WTG: HANNING  
ATTEN: -30 DB  
REEL: 410  
INDEX 362



KOE 10 X 10 TO THE INCHES / 10 INCHES  
NEUFEL & ESSER CO. MADE IN U.S.A.

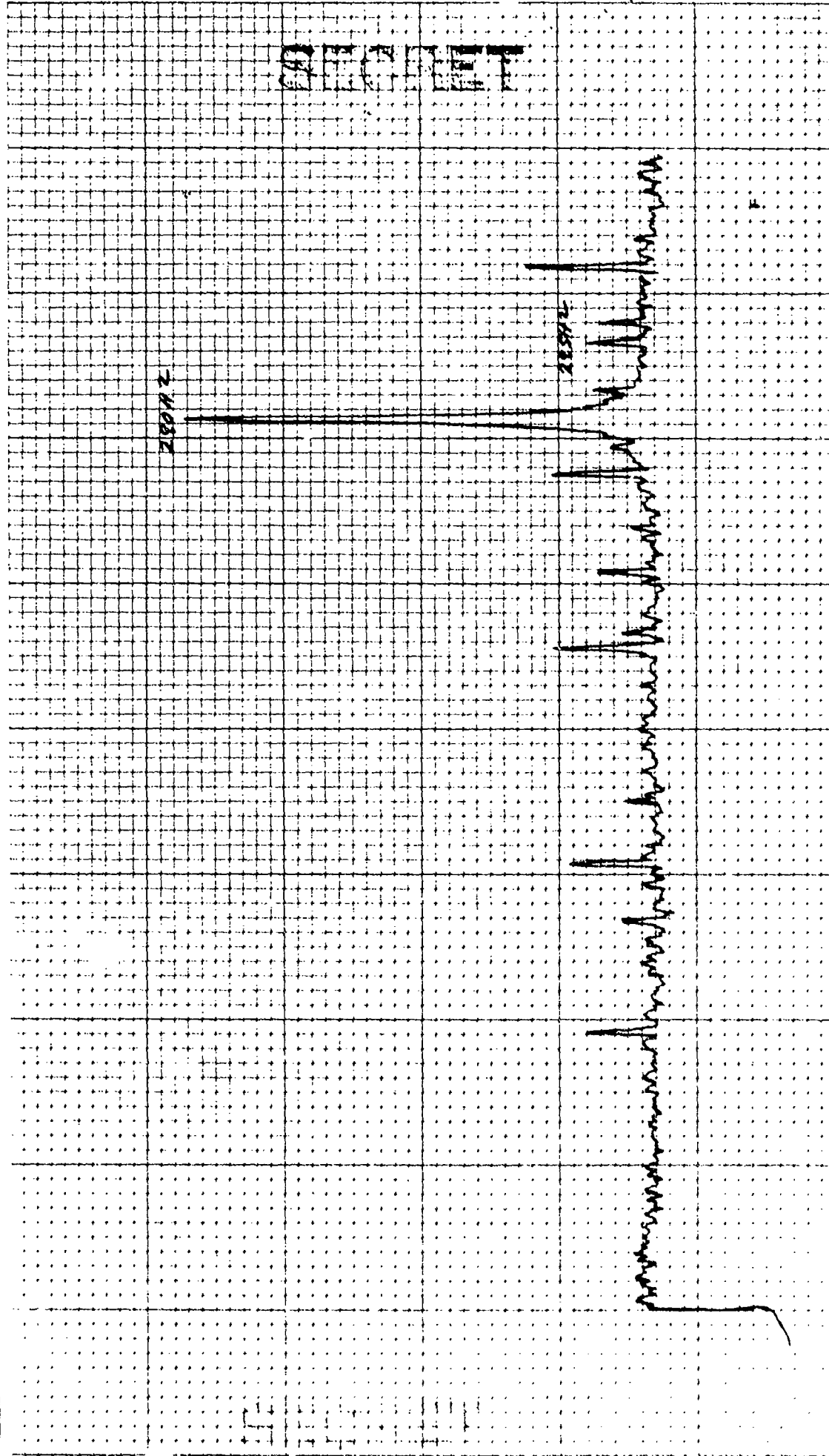
46 0703

CONTROL: 2031 - 51 ( DP1 )  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53  
DATE/TIME: 3-15-77 - 2031 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
48 DEG. AZ STEERING

REEL: N10  
INDE X3620

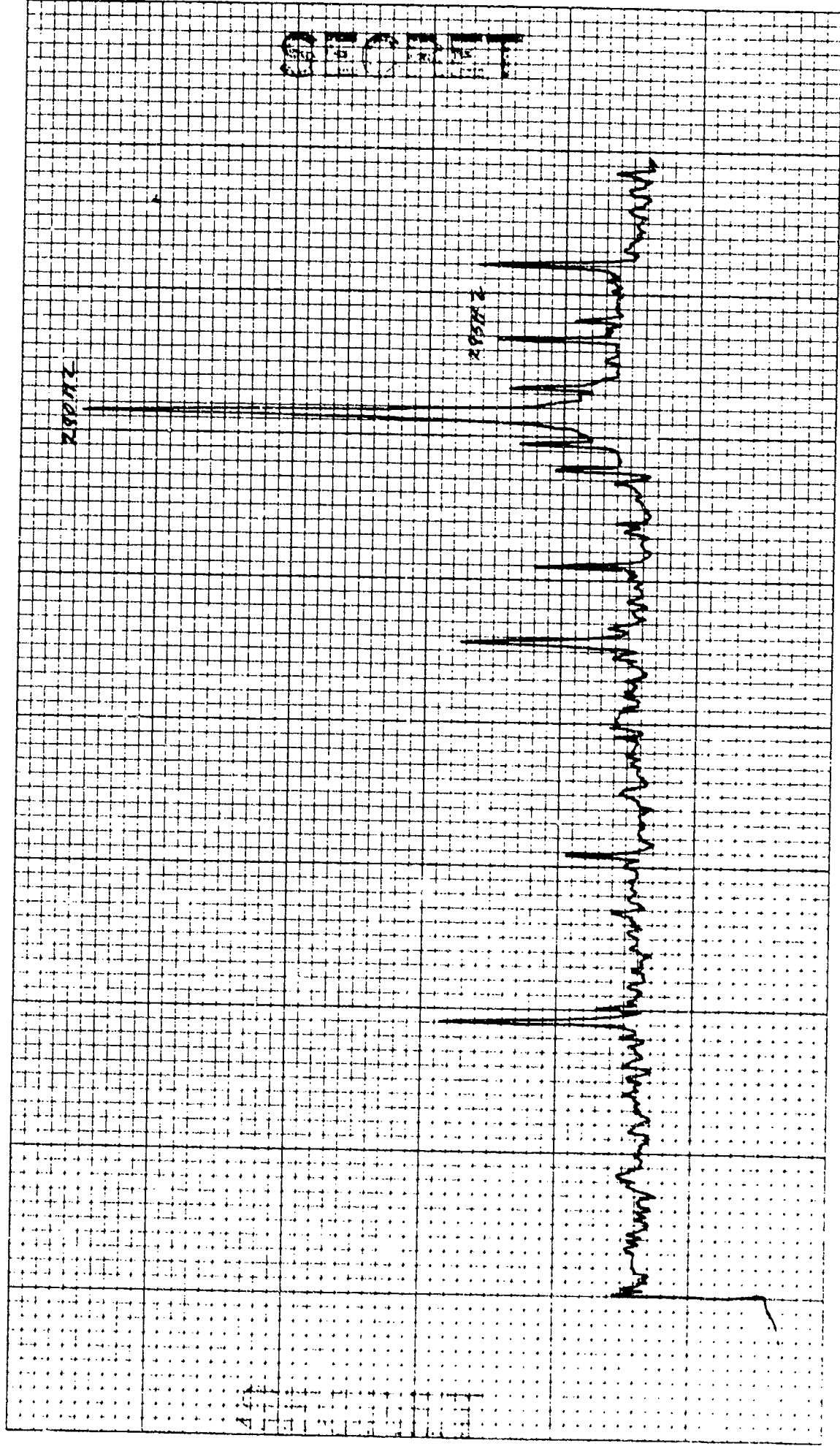
INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILLER  
WTG: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES  
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

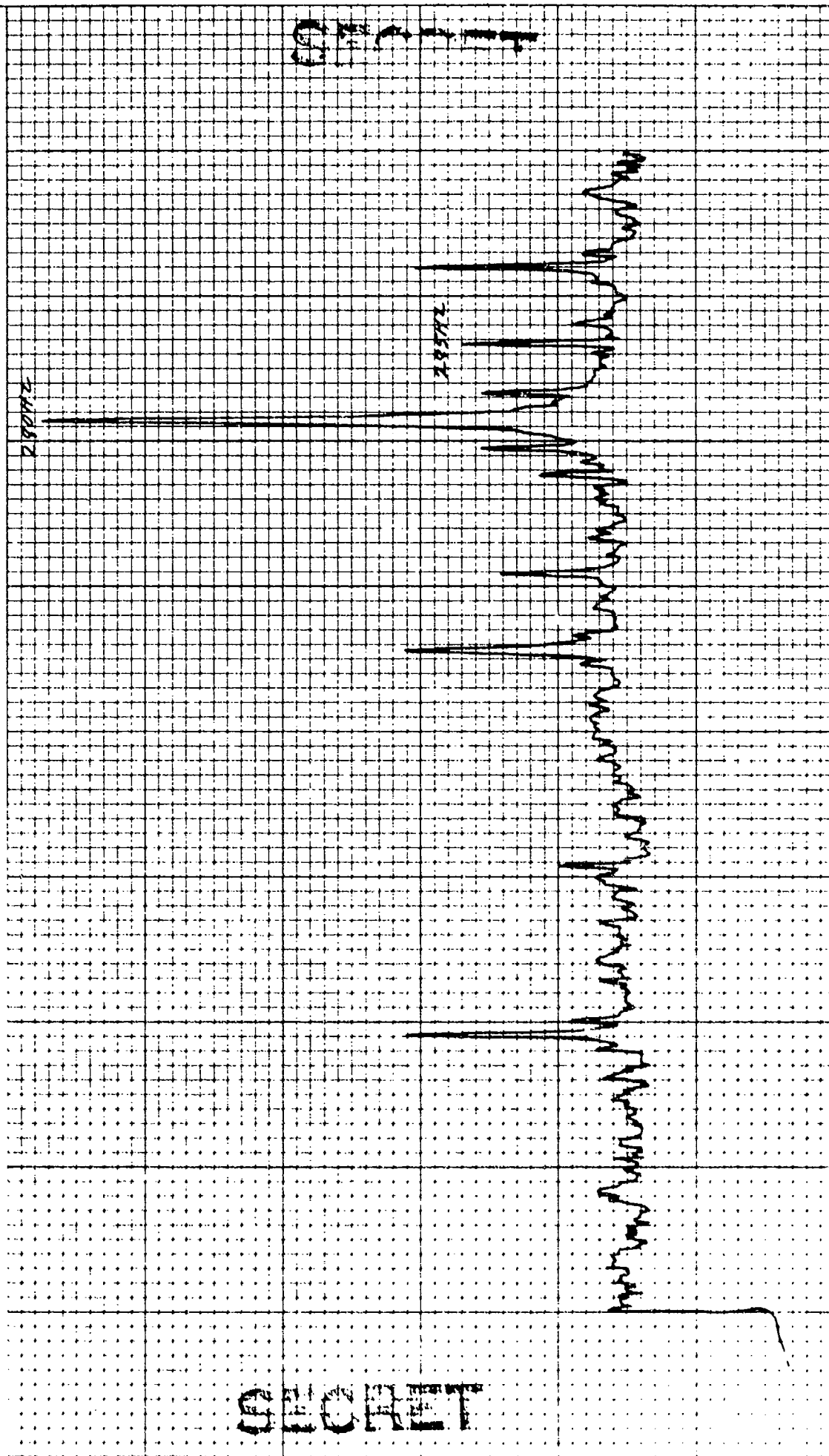
CONTROL: 2121 - 51 (389) DATE OF ANALYSIS: 1-26-53 REEL: 410 INDE X300  
BEAMFORMED SPECTRUM (ELEMENTS) )  
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 213/Z INTEGRATION TIME 320 SECS ATTN: -30DB  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING  
51 ELEMENTS +50 DEG. AZ STEERING



KOE 19 X 10 TO THE INCH • 7 X 10 INCHES  
KLUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: 1-26-53 REEL: 410 INDE X 3620  
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-53  
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 2151 Z INTEGRATION TIME 320 SECS ATEN: -30DB  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING  
51 ELEMENTS 451 DEG. AZ STEERING

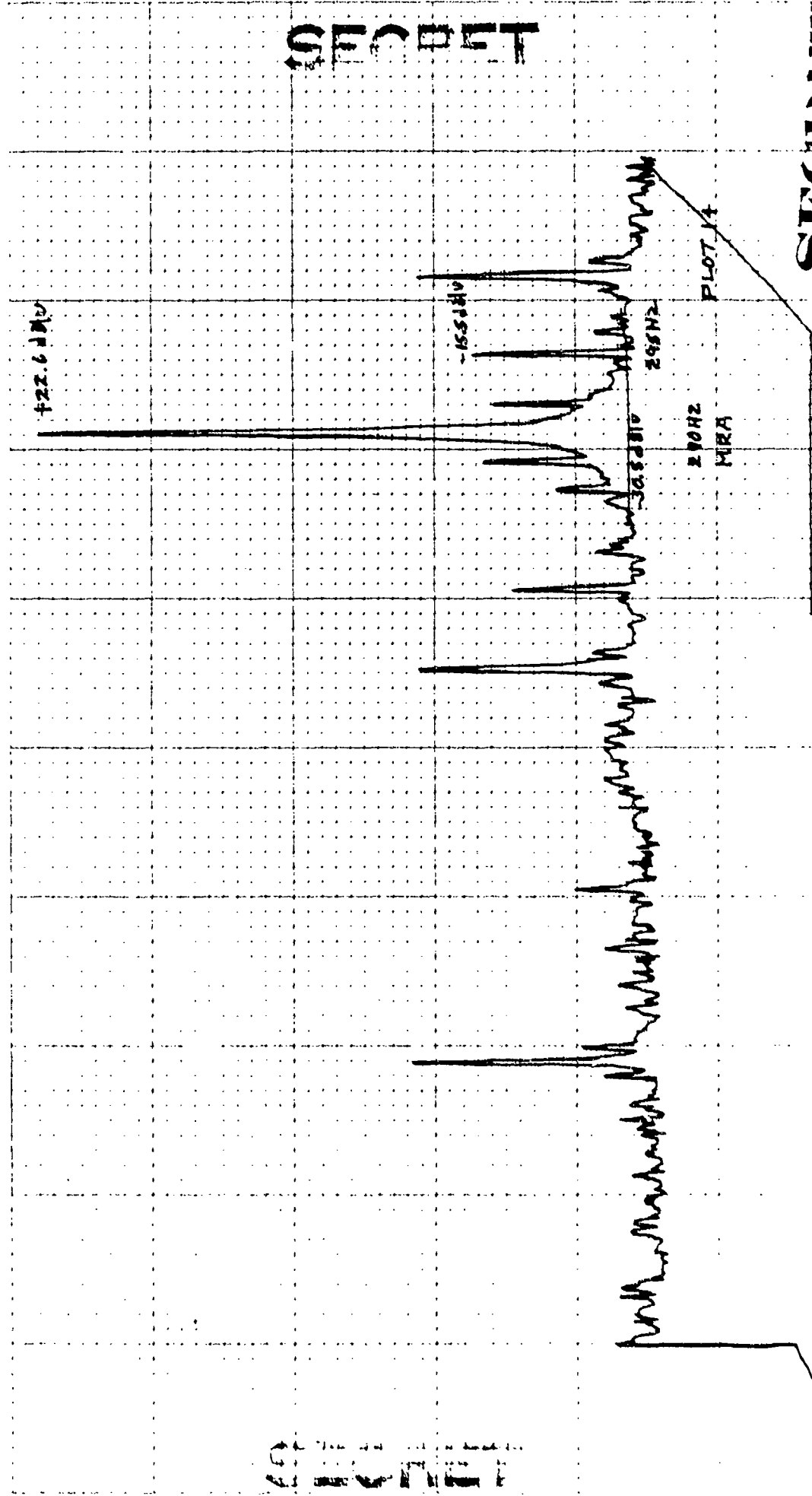


46 0703

**SECRET**

CONTROL: 2131 - 51 (DPG) DATE OF ANALYSIS: \_\_\_\_\_  
 BEAMFORMED SPECTRUM(ELEMENTS) 1524 297053  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
51 ELEMENTS  
 REEL: N10 INDE X3620  
 INTEGRATION TIME 320 SECS ATTEN: - DB  
 FILTER WTC: HANNING

DATE/TIME: 3-15-77 - 2131 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
151.5 DEG. AZ STEERING



232 Hz

270 Hz

308 Hz

**SECRET**

KOE 10 X 10 TO THE INCH 0.7 X 10 INCHES  
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 51 (DPF)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

51 ELEMENTS

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 3-15-77 - 0131Z

ANALYSIS BANDWIDTH: 1/10 HZ

+52 DEG. AZ STEERING

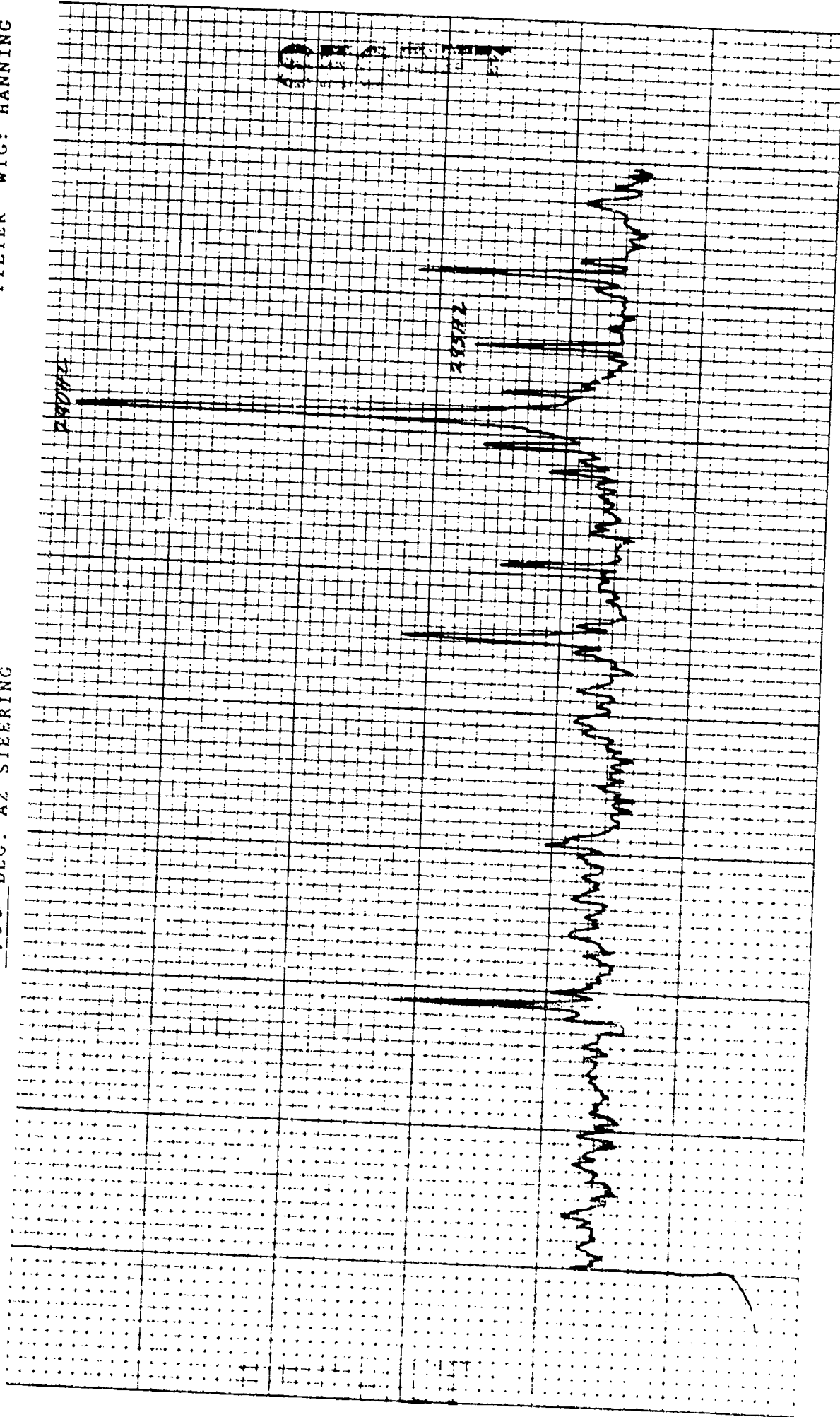
REEL: 410

INDE X 3620

INTEGRATION TIME 320 SECS

ATTEN: -30 DB

FILTER WIG: HANNING



KOE 10 X 10 TO THE INCH 7 1/2 INCHES  
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DPP)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
51 ELEMENTS

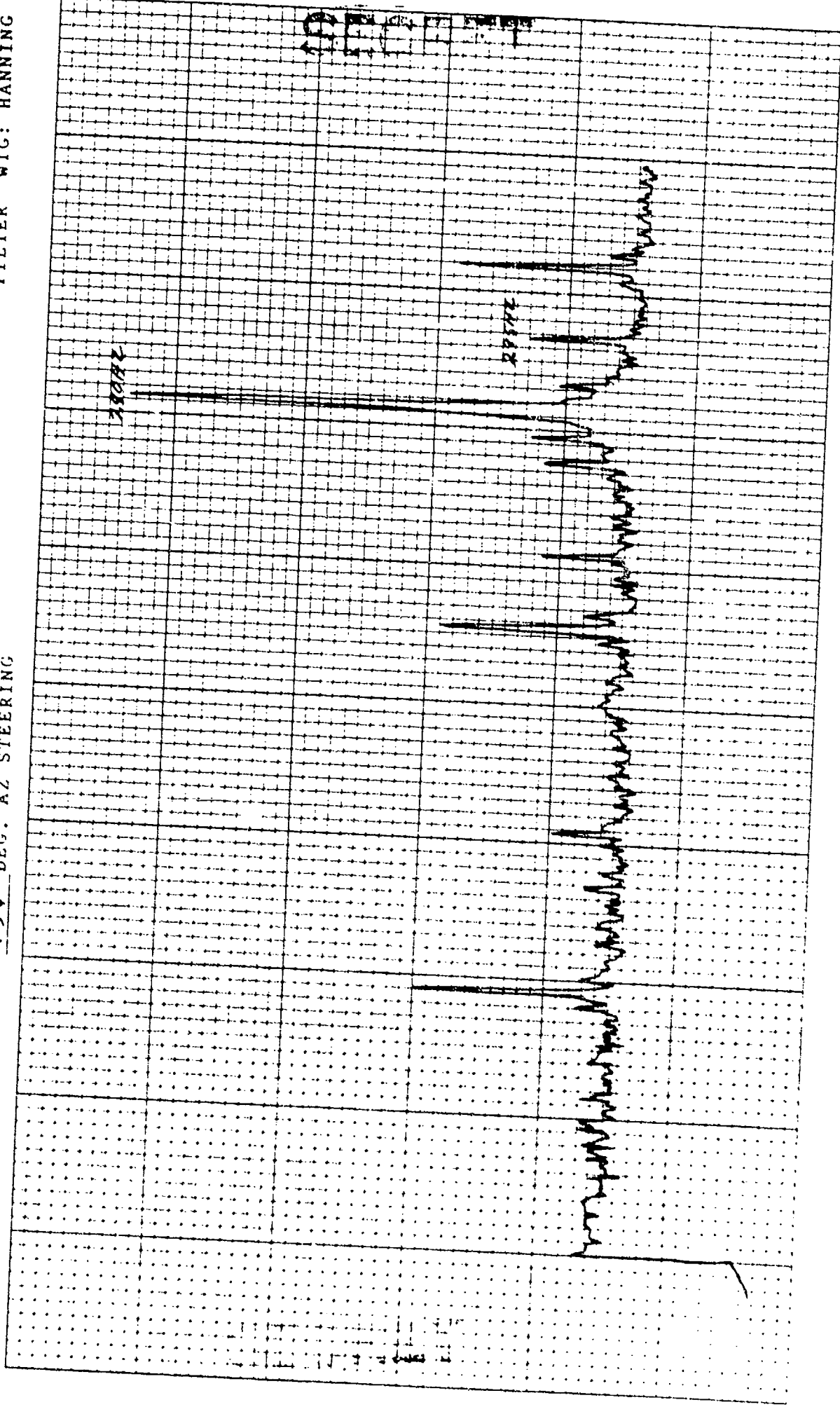
DATE OF ANALYSIS: 1-26-53  
DATE/TIME: 2-15-77 - 2121 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+ 54 DEG. AZ STEERING

REF: 110

INDE X3620

INTEGRATION TIME 320 SECS  
FILTER

ATTEN: -30 DB  
WTC: HANNING

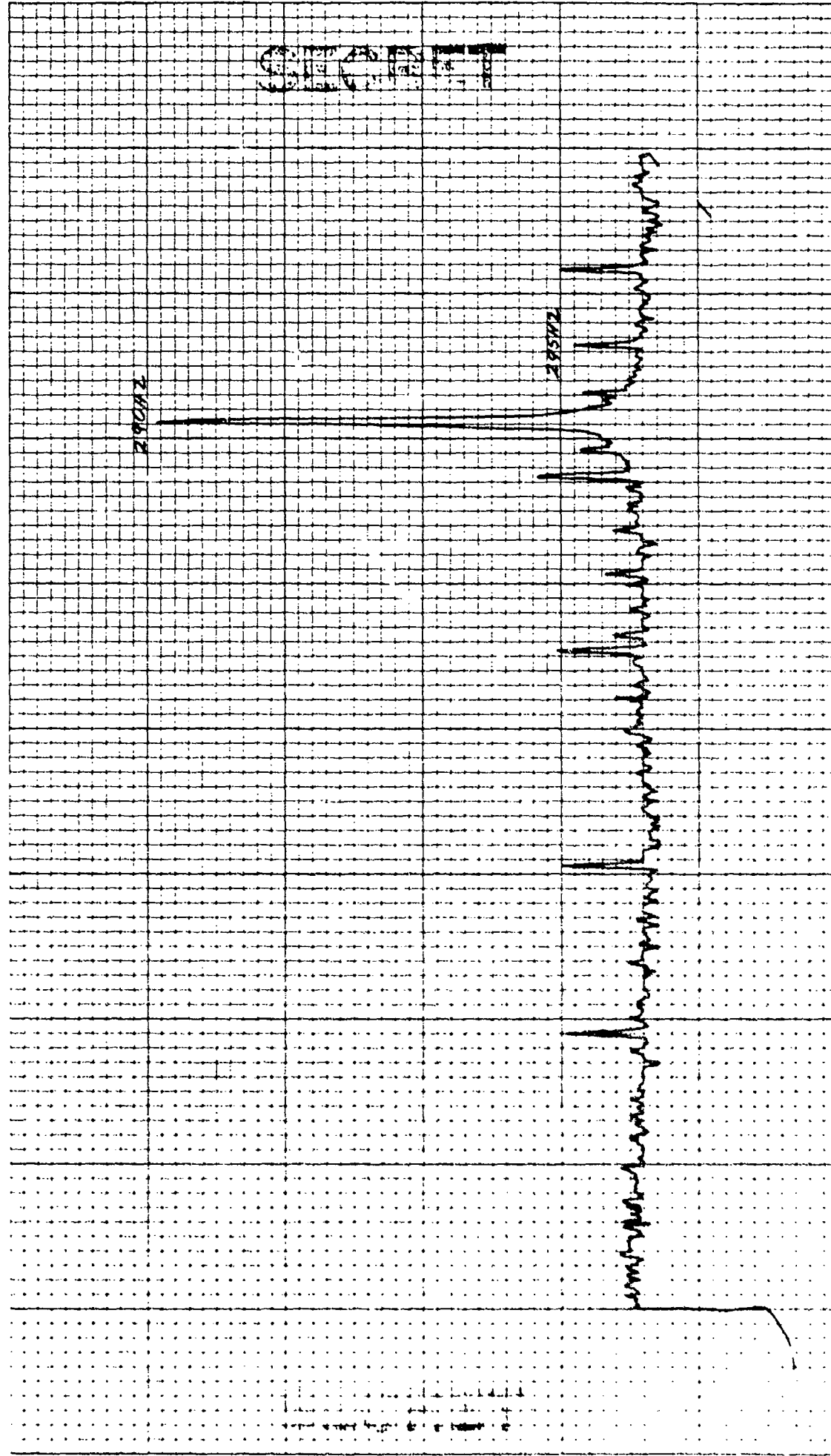




KOE 10 X 10 TO THE INCH = 2.5 X 10 HCHFS  
REFUEL 6.5521R 0.0 0.00000000

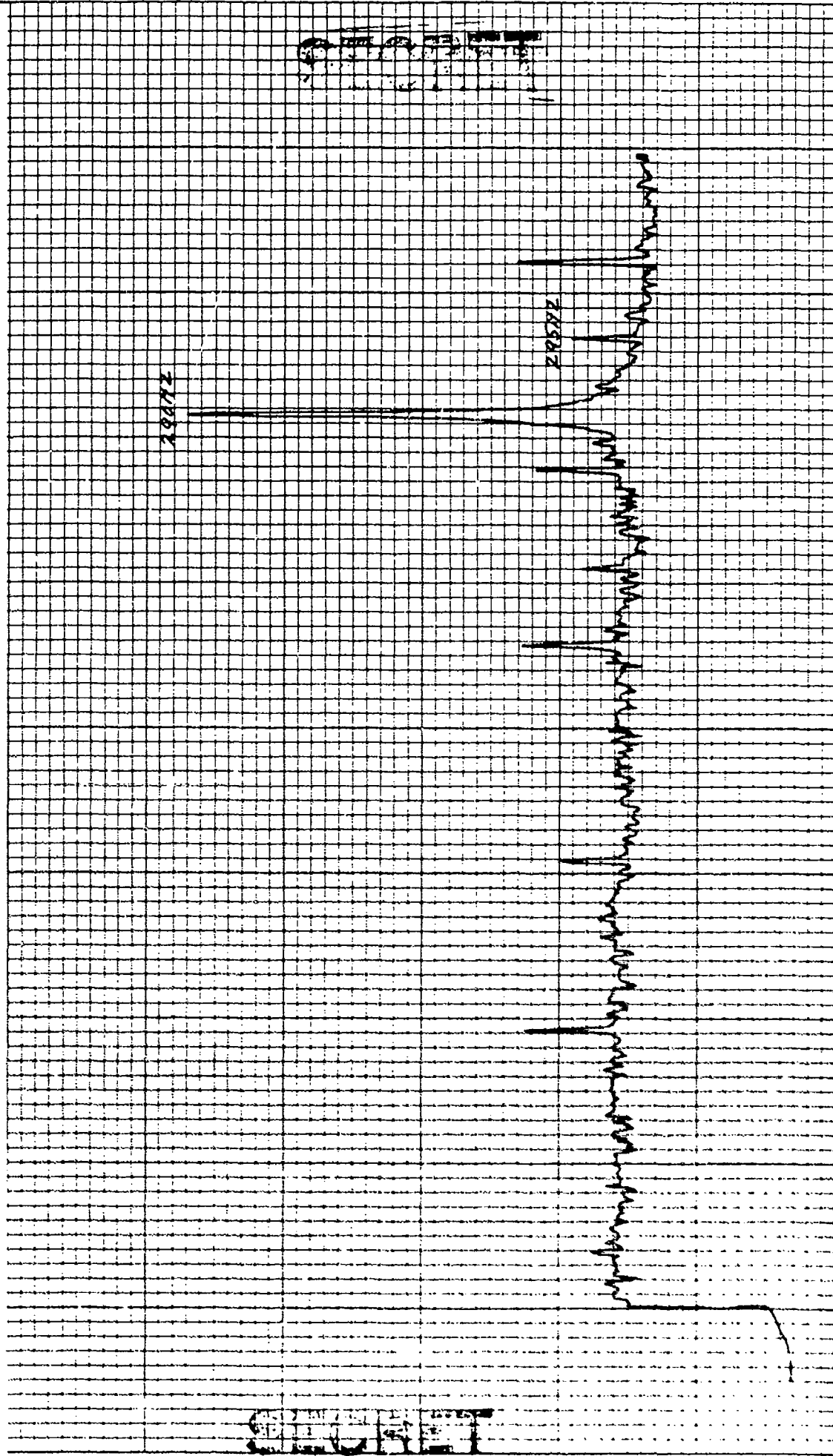
46 0703

CONTROL: 2131 - 51 (089) DATE OF ANALYSIS: - - -  
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53)  
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ  
5/ ELEMENTS + 56 DEG. AZ STEERING  
REEL: 110 INTEGRATION TIME 320 SECS FILTER  
ATTEN: -20 DB WTG: HANNING  
JNDE X 3620



46 0703

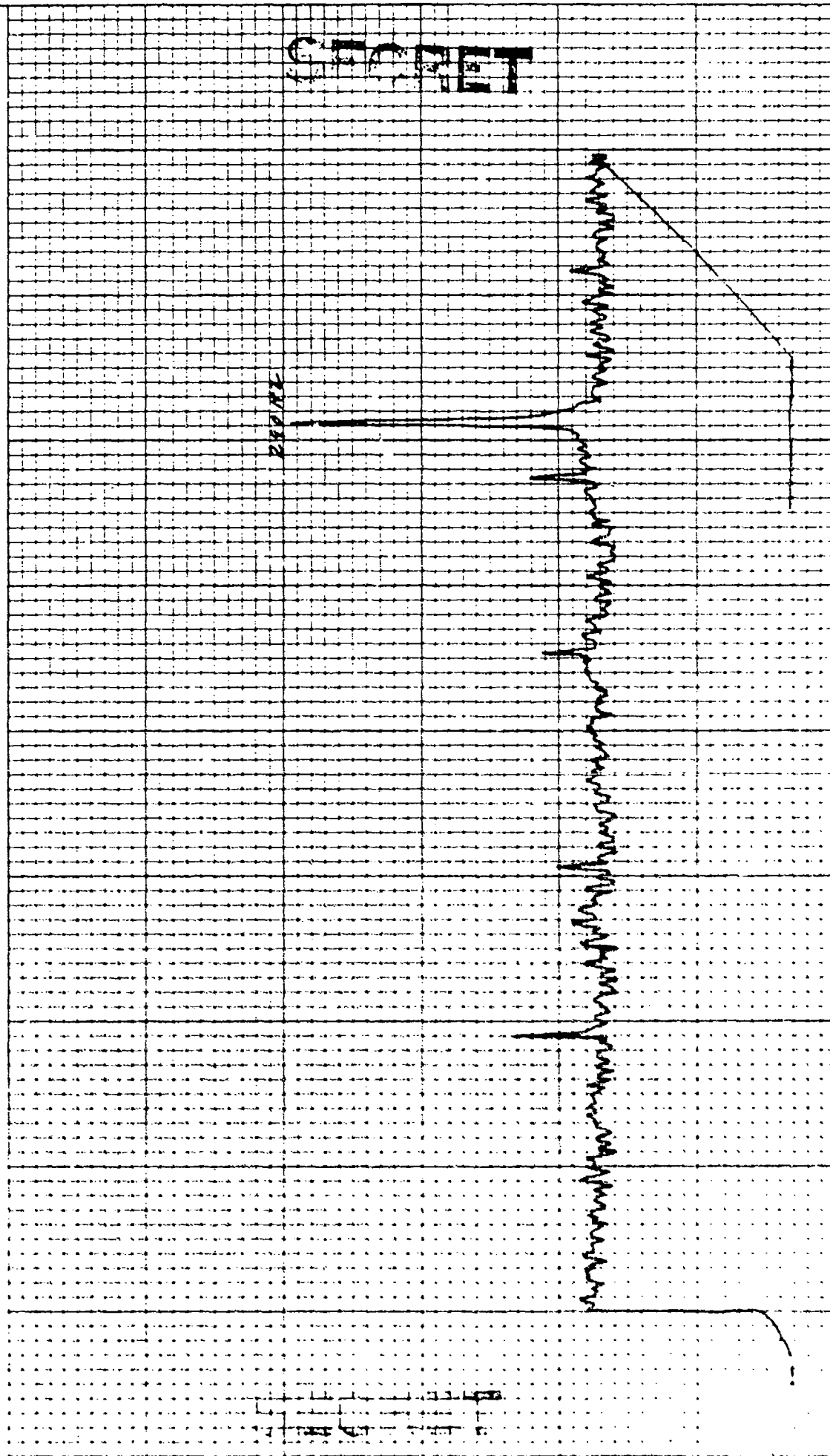
CONTROL: 2131 - 571 (DPG)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
51 ELEMENTS  
DATE OF ANALYSIS: 1-26-53 )  
DATE/TIME: 315-77 - 2131 Z  
ANALYSIS BANDWIDTH: 11 / 10 HZ  
+50 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS  
REEL: 410 INDEX X3620  
ATTN: 30 DB  
WTG: HANNING



10.8 IN TO THE INCHES  
1/2 INCHES

46 0703

CONTROL: 2/3/ - 5/ (DP9) REEL: 410 INDE X 3620  
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-89-53  
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 2/3/ Z INTEGRATION TIME 320 SECS ATTN: -30 DB  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING  
5/ ELEMENTS +60 DEC. AZ STEERING





**DEPARTMENT OF THE NAVY**

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IN REPLY REFER TO:

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Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT  
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Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

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# Declassified LRAPP Documents

| Report Number | Personal Author       | Title                                                                                                                                                                                                         | Publication Source (Originator) | Pub. Date | Current Availability                 | Class. |
|---------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------|--------------------------------------|--------|
| Unavailable   | Bossard, David C.     | ACOUSTIC ANALYSIS/ASEPS                                                                                                                                                                                       | Wagner Associates               | 780726    | ADA076268                            | U      |
| NRLMR3832     | Heitmeyer, R., et al. | PRELIMINARY RESULTS OF AN ANALYSIS OF BEAM NOISE IN THE MEDITERRANEAN (U)                                                                                                                                     | Naval Research Laboratory       | 780901    | AD <del>616</del> <sup>ND</sup> 7220 | U      |
| Unavailable   | Watrous, B. A.        | PARKA I OCEANOGRAPHIC DATA COMPENDIUM                                                                                                                                                                         | Naval Ocean R&D Activity        | 781101    | ADB115967                            | U      |
| Unavailable   | Dunbar, B., et al.    | LAMBDA PROCESSING LABORATORY AND ENGINEERING SUPPORT, FINAL REPORT 1 JANUARY 1977 - 31 OCTOBER 1978                                                                                                           | Texas Instruments, Inc.         | 781129    | ND                                   | U      |
| Unavailable   | Blumen, L. S., et al. | ASTRAL MODEL. VOLUME 2: SOFTWARE IMPLEMENTATION                                                                                                                                                               | Science Applications, Inc.      | 790101    | ADA956122                            | U      |
| Unavailable   | Spofford, C. W.       | ASTRAL MODEL. VOLUME 1: TECHNICAL DESCRIPTION                                                                                                                                                                 | Science Applications, Inc.      | 790101    | ADA956124                            | U      |
| Unavailable   | Townsend, R., et al.  | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IA. OVERALL PROGRAM PERFORMANCE RESULTS WITH TEST RESULTS SUMMARY | Sanders Associates, Inc.        | 790101    | ADC017573                            | U      |
| Unavailable   | Unavailable           | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IB. DETAILED DESCRIPTION. TEST RESULTS                            | Sanders Associates, Inc.        | 790101    | ADC017574                            | U      |
| Unavailable   | Unavailable           | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME II. DATA ANALYSIS FACILITY AND DATA REDUCTION METHODOLOGY         | Sanders Associates, Inc.        | 790109    | ADC017575                            | U      |
| Unavailable   | Unavailable           | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIA. DATA POINTS 1, 2 AND 3 RAW DATA                             | Sanders Associates, Inc.        | 790109    | ADC017576                            | U      |
| Unavailable   | Unavailable           | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIB. DATA POINTS 4, 5 AND 6 RAW DATA                             | Sanders Associates, Inc.        | 790109    | ADC017577                            | U      |
| Unavailable   | Unavailable           | SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IVA. DATA POINTS 7, 8 AND 9 RAW DATA                              | Sanders Associates, Inc.        | 790109    | ADC017578                            | U      |